Teachers open the door, but you must enter by yourself

Undergraduate

BULLETIN

Department of

Mechanical Engineering

Chittagong University of Engineering & Technology
Chattogram-4349, Bangladesh.

UNDERGRADUATE
Bulletin

March 2022

Department of
Mechanical Engineering
Chittagong University of Engineering & Technology
Chattogram-4349, Bangladesh.

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Chittagong University of Engineering & Technology (CUET)
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Message *from* The Vice-Chancellor *and* The Dean

It is my immense pleasure to know that Mechanical Engineering Department is going to publish an undergraduate bulletin for their students. I really appreciate their great efforts. I do believe that this prospectus could be of great use for students, teachers, researchers and policy makers. It is my great pleasure to welcome your contributions to establish Chittagong University of Engineering & Technology (CUET) as “Centre of Excellence”.

My special congratulation goes to faculty members, researchers, staffs, and students, in particular, who have got admitted in 2020-2021 session. As we know, the Chittagong University of Engineering & Technology (CUET) has started its journey with a core mission of producing quality human resources who could contribute nationally and globally, particularly in the field of engineering and technology. It has been functioning with a good reputation over the period of 53 years since its inception as engineering college in 1968.

Currently, there are 18 departments, 3 institutes, 3 research centers and a language center in this university. This university offers various engineering subjects for undergraduate students under different departments, and about 900 undergraduate students get admitted in every academic year in those departments through a highly competitive admission test. Laterally, this university also runs various post-graduate programs, such as Master of Science (MSc), Master of Engineering (M.Eng.), Master of Philosophy (M.Phil.), Post-Graduate Diploma (PGD), and Doctor of Philosophy (PhD). Academic programs are harmonized with regularly updated global engineering curricula that help students to compete in the global job market.

Mechanical Engineering is one of the most prestigious departments in this university and even more, it has been gaining popularity day by day.

We emphasize close interaction with outstanding faculty to create an atmosphere truly conducive to learning. In the recent past, we have added degree programs in Petroleum and Mining Engineering and Mechatronics and Industrial Engineering under the Faculty of Mechanical Engineering. The programs offer curricula that combine a strong theoretical background with hands-on experience in excellent labs, and focus on teamwork and communication skills.

The graduate programs (Master and doctoral) in this Department of Mechanical Engineering offer opportunities for advanced study and research designed to prepare students for leadership roles in engineering careers with industry, government, or educational institutions. They also provide a pathway toward self-improvement and lifelong learning for practicing engineers.

Mechanical Engineering is the studies of energy, its transformation and utilization; and applied mechanics and design. It also focuses on fluid mechanics, applied mechanics, heat transfer, and environmental pollution. In CUET, Mechanical Engineering department has been one of the most prestigious departments since its inception in 1968. I am very pleased for the graduates of ME department, CUET who have been working in different national and international organizations with a good reputation. I also deeply acknowledge their contributions in nation building, particularly to meet the challenges of 21st century, and to achieve the Millennium Development Goals (MDGs).

I appreciate the faculty members and staff of Mechanical Engineering department for their dedication, sincerity and hard working. I am sure that their efforts will bring glories to this university.

Wish you all the very best.

(Prof. Dr. Mohammad Rafiqul Alam)
Vice-Chancellor
and
Dean (In charge), Faculty of Mechanical Engineering
Chittagong University of Engineering & Technology
Chattogram-4349

Message *from* The Head

The Department of Mechanical Engineering established to focus expertise and leadership on the graduates. We are offering the undergraduate (4 years B.Sc. Engineering) and the postgraduate level programs to meet the need of the society and thus contributing to the economic growth of the country. The courses cover a wide range, including electronics, computing, information processing, thermodynamics, industrial management, and control theory etc. to cope up with the today's interdisciplinary demand.

The Department of Mechanical Engineering is established to strive for excellence through the creation, preservation, transfer, and application of knowledge to her graduates. The engineering education in the Department of Mechanical Engineering, CUET is respected and valued for its research and education quality at both the national and international level. Along with an exceptional undergraduate program, here a substantial program is offered at the postgraduate level aimed at meeting the needs of industries and thus contributing to the economic growth of the country. The engineering education in the Department of Mechanical Engineering covers a wide range of courses, including electronics, computing, information processing, industrial management, robotics, control theory, etc. along with core mechanical engineering courses. The main objective of this department is to maintain a high standard of mechanical engineering education through excellent teaching-learning and innovative curricula that reflect the changing needs of the society. It is also aimed to demonstrate and disseminate research outcomes through publications and undertake collaborative research to create opportunities for long-term interaction with academia and industries. The Department of Mechanical Engineering is proud to have dedicated faculty members with high qualifications and accomplishments. The department's state-of-the-art facilities and instrumentation provide the support tools for comprehensive educational and research activities. The course curriculum is updated regularly to provide quality education and moral values and to cope with the recent advancement in the field of engineering. The graduates from the Department of Mechanical Engineering have been very successful and

have risen to distinguished positions in the industry, government, and academia at home and abroad.

Besides the academic activities, the department of mechanical engineering has organized several national and international seminars, workshops and conferences. The Department of Mechanical Engineering proudly organizes the International Conference on Mechanical Engineering and Renewable Energy biannually (ICMERE). The Department also conducts Robo-race competition, mechanics Olympiad, CAD competition, etc.

I thank and congratulate the faculty members for their priceless effort in publishing this bulletin. Hopefully, the publication will fulfill the requirements for the students as well as the faculty members.

(Prof. Dr. Kazi Afzalur Rahman)
Head
Department of Mechanical Engineering
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Chattogram-4349. Bangladesh.

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GENERAL INFORMATION

1.1 Introduction

Chittagong University of Engineering and Technology (CUET) is one of the prominent and leading, autonomous self-degree awarding University of Bangladesh in the field of Engineering and Technological Education. It is unique and incompatible because of its proximity of Chattogram, the major sea port and hill city of Bangladesh. The University is situated alongside the Chattogram-Kaptai road, 25 km away from the heart of commercial capital of Bangladesh. Moreover, attractive tourist spot of of the country like the largest hydroelectric power plant at Kaptai, the natural lake of Kaptai, hills of Rangamati and Bandarban, and the longest sea beach of the world and tourist resort of Cox's Bazar are not more than a few hours journey from the University. The University has a beautiful hill side land of about 163 acres with panoramic natural view. The main vision of CUET is to send out graduates with trained and educated minds, to serve as a source of intellectual potentiality. To foster and promote a distinctive educational institute, identity and spirit is one of the basic goals of the university.

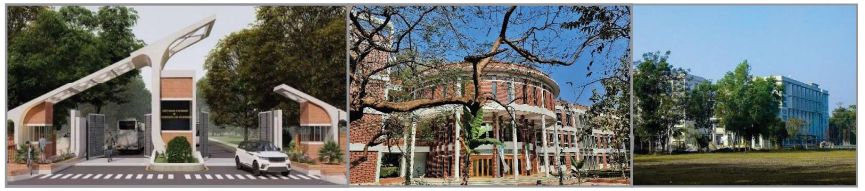
1.2 Historical Background

August 28, 1962: To meet the increasing demand of professional engineers for the national development, the national economic council of the Government of Pakistan decided to establish the Engineering College, Chittagong.

December 28, 1968: The College started functioning by admitting 120 students in its first academic session under the faculty of Engineering, University of Chittagong.

July 1, 1968: The college was declared as a self-degree awarding institution and was renamed "Bangladesh Institute of Technology (BIT), Chittagong".

September 1, 2003: To enlarge the engineering education, the institution was converted into a university named as "Chittagong University of Engineering & Technology (CUET)".



1.3 Faculties and Departments

The University has 18 teaching departments under five faculties. All departments except the department of Humanities offer degree programs; however, some of them offer only postgraduate (PG) degrees. In addition, the university has 3 institutes & 4 research centers. Faculty based list of the departments with the currently offered degree programs is given below.

Department	Offering degree programs
Faculty of Civil Engineering	
Department of Civil Engineering	UG and PG
Department of Disaster Engineering and Management	PG
Department of Water Resource Engineering	UG
Faculty of Mechanical Engineering	
Department of Mechanical Engineering	UG and PG
Department of Petroleum Engineering	UG
Department of Mechatronics & Industrial Engineering	UG
Faculty of Electrical & Computer Engineering	
Department of Electrical & Electronic Engineering	UG and PG
Department of Computer Science & Engineering	UG and PG
Department of Electronic & Telecommunication Engineering	UG and PG
Department of Biomedical Engineering	UG
Faculty of Architecture & Planning	
Department of Architecture	UG
Department of Urban & Regional Planning	UG
Department of Humanities	---
Faculty of Engineering & Technology	
Department of Physics	PG
Department of Chemistry	PG
Department of Mathematics	PG
Department of Materials Science and Engineering	UG and PG
Department of Nuclear Engineering	PG
Institutes	
Institute of Energy Technology (IET)	PG
Institute of Earthquake Engineering Research (IEER)	PGD
Institute of Information & Communication Technology (IICT)	PGD
Research Centers	
Center for Environmental Science and Engineering (CESE)	---
Center for River, Harbor & Landslide Research (CRHLSR)	---
Center for Industrial Problems Research (CIPR)	---
Language Center (LC)	---

• UG-Undergraduate; PG-Post-graduate; PGD- Post-graduate Diploma

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1.4 University Administration

The Honorable President of the People's Republic of Bangladesh is the Chancellor of the University The Vice-Chancellor is the chief executive officer of the University. The Syndicate is the principal executive body of the university and comprises sixteen members. The Academic Council, Finance Committee, Planning and Development Committee etc. assist the Syndicate. The Academic Council, comprising the faculty of the University and other external expert members, is the apex educational body of the University.

Chancellor : Mr. Md. Abdul Hamid
Honorable president
The People's Republic of Bangladesh
Vice Chancellor : Prof. Dr. Mohammad Rafiqul Alam
Registrar (Additional Charge) : Prof. Dr. Faruque-Uz-Zaman Choyvdhury

Dean of Faculties

Faculty of Civil Engineering : Prof. Dr. Md. Moinul Islam
Faculty of Electrical & Computer Engg. : Prof. Dr. Mohammed Moshiul Hoque
Faculty of Engineering & Technology : Prof. Dr. Sunil Dhar
Faculty of Mechanical Engineering : Prof Dr. Mohammad Rafiqul Alam
Faculty of Architecture & Planning : Prof Dr. Mohammad Kamrul Hassan

Directors/Chairmans

Director, IICT : Prof. Dr. Abu Hasnat Mohammad Ashfak Habib
Director, IET : Prof. Dr. Muhammad Quamruzzaman
Director, P and D : Prof. Dr. Quazi Delwar Hossain
Director, R and E : Prof. Dr. Ranajit Kumar Sutradhar
Director, IEER : Prof. Dr. Muhammad Abdur Rahman Bhuiyan
Director, BRTC : Prof. Dr. Dr. Md. Mahbubul Alam
Director, Students' Welfare : Prof. Dr. Md. Rezaul Karim
Chairman, CRHLSR : Prof. Dr. Bipul Chandra Mondal
Chairman, CESER : Prof. Dr. G.M. Sadiqul Islam
Chairman, CIPR : Prof. Dr. Muhammad Quamruzzaman

Administrative Officers

Controller of Examination (Additional Charge) : Prof. Dr. Bodius Salam
Comptroller : Md. Shafiqul Islam
Librarian : Md. Abdul Khalaque Sarker

Provosts of Residential Halls

Bangabandhu Hall : Mr. Syed Masrur Ahmmad
Shaheed Tareq Huda Hall : Prof. Dr. Md. Sanaul Rabbi
Dr. Qudrat-E-Khuda Hall : Prof. Dr. Md. Arafat Rahman
Shaheed Mohammad Shah Hall : Prof. Dr. Ranajit Kumar Sutradhar
Seikh Rasel Hall : Prof. Dr. Md. Reaz Akter Mullick
Sufia Kamal Hall : Prof. Dr. Mst. Farzana Rahman Zuthi
Shamshen Nahar Khan Hall : Prof. Dr. Rajia Sultana

1.5 Academic Activities:

Undergraduate courses under the Faculty of Civil Engineering, Faculty of Electrical & Computer Engineering, Faculty of Engineering & Technology and Faculty of Mechanical Engineering extend over four years and lead to B.Sc. Engineering degree in Civil, Electrical & Electronics, Mechanical, Petroleum & Mining, Computer Science & Engineering, Electronics and Telecommunication, Water Resources Engineering, Mechatronics and Industrial Engineering, Biomedical Engineering, Material Science & Engineering. And the undergraduate courses under the Faculty of Architecture & Planning extend over four or five years and lead to B.Sc. degree in Architecture, and Urban & Regional Planning.

Postgraduate studies and research are now one of the primary functions of this University. Department of Civil Engineering, Electrical & Electronic Engineering, Electronics & Telecommunication Engineering, Mechanical Engineering, Computer Science & Engineering, Physics, Mathematics, and Chemistry offers M.Sc. Engg./M.Engg./M. Phil./PhD degrees. Besides its own research programs, the university undertakes research programs sponsored by outside organizations. The expertise of the University teachers and the laboratory facilities of the university are also utilized to solve problems and to provide up-to-date engineering and technological knowledge to the various organizations of the country. The University is persistent in its effort to improve its research facilities, staff position, courses and curriculum to meet the growing techno-logical challenges.

FACULTY OF MECHANICAL ENGINEERING

Faculty of Mechanical Engineering was established in 2011 with two-degree awarding department; Department of Mechanical Engineering and Department of Petroleum and Mining Engineering. Both departments offer Bachelor of Science degree. At the postgraduate level it offers Master of Engineering and Doctor of Philosophy degrees in mechanical and its related disciplines. Department of Mechatronics and Industrial Engineering has started their academic curriculum under this faculty from 2015. The Faculty of Mechanical Engineering is proud to have dedicated faculty members with high qualifications and accomplishments.

DEPARTMENT OF MECHANICAL ENGINEERING

2.1 Introduction

Mechanical Engineering is one of the degrees awarding departments which Mechanical Engineering is one of the degree awarding departments which and leadership to its graduates, it was started in 1968 through undergraduate program and later introduced Master's program in 1999. In every year, after completion of H.S.C examination, 180 students are enrolled here in undergraduate course which extends over four years. Moreover, nearly 50 students are enrolled in postgraduate studies every year.

Along with the undergraduate program, here a strong program is offered at the postgraduate level aimed at meeting the needs of industries and thus contributing to the economic growth of the country. Mechanical Engineering is a very wide-ranging field of engineering that involves the application of physical principles for analysis, design, manufacture, installation, operation and maintenance of mechanical systems including internal combustion engines, pumps, fans, blowers, turbines, boilers, refrigerators and air-conditioners, condensers, etc. The major divisions of mechanical engineering are designs and controls, thermo-science and fluids, engineering mechanics and manufacturing. The courses cover a wide range of courses, including electronics, computing, information processing, industrial management, control theory etc. along with core Mechanical Engineering courses. The main aim of this department is to prepare graduates having the knowledge of mechanical engineering integrated with interdisciplinary subjects with an international perspective that ensures organizational competitiveness and growth in a dynamic technological and business environment.

The department of Mechanical Engineering has been recognized for its research and education quality at both national and international level. Our graduates have been very successful and have risen to distinguished positions in the industry, government and academia. The department's state-of-the-art facilities and instrumentation provide the support tools for comprehensive educational and research activities.

Vision

To provide a world-class education and to conduct innovative research that instill the professional, technical, critical-thinking, and communication skills necessary for students and faculty to make impactful contributions to society as well as for the whole universe.

Mission

- To provide world class environment for high quality education and innovative research in the field of Mechanical Engineering.
- To create knowledge through innovative research in the field of Mechanical

Engineering and share knowledge through educational programs and dissemination of new discoveries.

- To develop the professional potential, ethical values, practical knowledge and skills of students in order to meet the demand of emerging world.
- To impart quality education through effective hi-tech teaching-learning techniques and department-industries collaboration.
- To meld the young dynamic potential minds to emerge as full-fledged future professionals in the field of Mechanical Engineering.

Program Education Outcomes

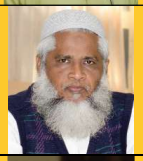
The Department of Mechanical Engineering forms the foundation for professional and personal development of the graduates:

- To excel in their engineering career in the public/private sectors or academia by applying the knowledge acquired in mathematical, computing and engineering principles and enhancing their skills to address the global challenges faced in mechanical and allied engineering streams.
- To use the techniques of engineering science and their applications to conceive, organize and develop the design of mechanical and related engineering systems considering safety, sustainability, economic and social impacts.
- To acquire techno-commercial skills towards lifelong learning such as research interest and entrepreneurial ability to cater the societal problems.
- To demonstrate professionalism, ethics and ability to work as an individual and in teams on multi-disciplinary assignments in industries, research organizations and academic institutions both in national and global level through collaboration.

Program Outcomes

- **Engineering knowledge :** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **Problem analysis :** Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **Design/development of solutions :** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **Conduct investigations of complex problems :** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- **Modern tool usage :** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- **The engineer and society :** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- **Environment and sustainability :** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- **Ethics :** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- **Individual and team work :** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- **Communication :** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- **Project management and finance :** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- **Life-long learning :** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

2.2 Faculty Members of the Mechanical Engineering Department

Photo	Name/Designation/E-mail	Degree, Country and Field of Expertise
	**Dr. Kazi Afzalur Rahman** Professor and Head *afzal@cuet.ac.bd*	**PhD, Singapore** Thermo-fluid Engineering, Renewable Energy and Applied Mechanics
	**Dr. Md. Tazul Islam** Professor *tazul2003@cuet.ac.bd* *tazul2003@yahoo.com*	**PhD, Bangladesh** Fluid Mechanics and Renewable Energy
	**Dr. Bodius Salam** Professor *bsalam@cuet.ac.bd* *bodiussalam@yahoo.com*	**PhD, UK** Heat Transfer and Alternate Fuel
	**Dr. Md. Mahbubul Alam** Professor *malam@cuet.ac.bd* *mahbub87@yahoo.com*	**PhD, Japan** CFD and Renewable Energy
	**Dr. Sajal Chandra Banik** Professor *baniksajal@yahoo.com* *baniksajal@cuet.ac.bd*	**PhD, Japan** Mechatronics, Robotics
	**Dr. Jamal Uddin Ahamed** Professor *jamal293@yahoo.com* *jamal@cuet.ac.bd*	**PhD, Malaysia** Air Conditioning, Refrigeration, Heat Transfer, Energy, Exergy and Renewable Energy
	**Dr. Sheikh Muhammad Humayun Kabir** Professor *dalimuou@yahoo.com* *humayun@cuet.ac.bd*	**PhD, South Korea** Advanced Solid Mechanics and Low-Cycle-Fatigue
	**Dr. Mohammad Mizanur Rahman** Professor *mmrahman.cuet@yahoo.com* *mmrahman_me@cuet.ac.bd*	**PhD, Australia** Nano-catalyst, Alternative Fuel, Fuel Cell and Manufacturing Process
	**Dr. Muhammad Mostafa Kamal Bhuiya** Professor *mkamal@cuet.ac.bd*	**PhD, Australia** Thermodynamics, Heat Transfer, Operations Research, Industrial Management

	**Dr. Md. Sanaul Rabbi** Professor *rabbi@cuet.ac.bd*	**PhD, Japan** Non-Destructive Testing, Composite Materials, Computational Analysis and Industrial Automation
	**Dr. Md. Arafat Rahman** Professor *arafat@cuet.ac.bd*	**PhD, Australia** Material Science, Electrochemistry, Lithium Batteries, E-vehicle Design Technology, Vibration Analysis and Control
	**Md. Aminul Islam** Associate Professor *aislam@cuet.ac.bd*	**PhD, Canada** Materials Chemistry, Material Science and Technology, Thermodynamics, Fluids and Applied Mathematics
	**Syed Masrur Ahmmad** Associate Professor *masrur@cuet.ac.bd* *bdmasrur91@gmail.com*	**PhD, Malaysia (on going)** Mechanics, CAD, Mechatronics, Robotics and Control
	**Dr. A.S.M. Sayem** Associate Professor *a.sayem@cuet.ac.bd*	**PhD, Australia** Energy and Environment, Emission Control, Sustainability Science and Safety Engineering.
	**Dr. Prasanjit Das** Associate Professor *prasanjitd11@yahoo.com* *prasanjit@cuet.ac.bd*	**PhD, Australia** Fluid Dynamics, CFD, Scale Growth and Suppression Mechanism
	**Dr. Md. Mamunur Roshid** Associate Professor *mamuncuet2003@cuet.ac.bd*	**PhD, Australia** Bubble Acoustics & Bubble Dynamics, Mathematical and Numerical Modelling, Oceanography, ETP & STP Systems
	**Md. Kamrul Hasan** Assistant Professor *kamrul05@cuet.ac.bd*	**PhD, USA (on going)** Micro-Energy System Design (On leave)
	**Dr. Tilok Kumar Das** Assistant Professor *tilok_cuet@yahoo.com* *tilok@cuet.ac.bd*	**PhD, Australia** Mechatronics, Robotics, Micro/Nano Manipulation, Space System and Heat Transfer

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	**Dr. Md. Abu Mowazzem Hossain** Assistant Professor *mowazzem.uou@gmail.com* *mowazzem@cuet.ac.bd*	**PhD, South Korea** Failure Analysis, Fracture Mechanics and Advanced Manufacturing Engineering
	**Md. Mehdi Masud Talukder** Assistant Professor *mehdi@cuet.ac.bd*	**MSc, Bangladesh (on going)** Computational Mechanics
	**Muhammed Kamrul Islam** Assistant Professor *kamrul.cuetme@gmail.com* *kamrul@cuet.ac.bd*	**PhD, Australia (on going)** Industrial Engineering and Fuzzy Logic (On leave)
	**Ratan Kumar Das** Assistant Professor *ratan.kumar@cuet.ac.bd,* *ratanme06_cuet@yahoo.com*	**PhD, Canada (on going)** Thermo-Fluids, Green Technology and Micro plasma (On leave)
	**Bably Das** Assistant Professor *bablydasulsan@gmail.com* *bably@cuet.ac.bd*	**MSc, South Korea** Composite Materials Energy Materials and Combustion Technology
	***Moham Ed Abdur Razzaq*** Assistant Professor *abdur.razzaq56@yahoo.com* *a.razzaq@cuet.ac.bd*	**PhD, USA (on going)** Nano Particles, Nano Technology (On leave)
	**Mostafizur Rahman** Assistant Professor *rmostafiz31@gmail.com,* *mostafiz_rasel64@cuet.ac.bd*	**PhD, Japan (on going)** Vibration and Dynamics (On leave)
	**Farida Ahmed Koly** Assistant Professor farida@cuet.ac.bd	**PhD, USA (on going)** Biomechanics, Biomaterial, Energy Storage System, CFD, Aerodynamics (On leave)
	**Asma Ul Hosna** Assistant Professor asma@cuet.ac.bd	**MSc, Bangladesh (on going)** Engineering Mechanics, Solid Mechanics, Heat Transfer, Alternative Fuel, pyrolysis

	**Md. Imteaz Ahmed** Assistant Professor *imteaz@cuet.ac.bd,* *imteaz.me@gmail.com*	**MSc, Bangladesh** Air Conditioning, Renewable Energy and IoT, Robotics
	**Sourav Paul** Lecturer *sourav@cuet.ac.bd*	**MSc, Bangladesh** Computational Fluid Dynamics, Material Science, Strength of Materials, Aerodynamics
	**Safina-E-Tahura Siddiqui** Lecturer *safina@cuet.ac.bd*	**MSc, Bangladesh** Material Science, Strength of material, Fluid Mechanics, Energy Storage System and LIB
	**Md. Maruf Billah** Lecturer maruf@cuet.ac.bd	**MSc, Bangladesh** Engineering Mechanics, Mechanics of Materials, Engineering Drawing
	**Afnan Hasan** Lecturer *afnanhasan@cuet.ac.bd*	**MSc, Bangladesh (on going)** Composite material, Strength of Material, Robotics and AI, Refrigeration and Air Conditioning
	**Radheshyam Nath Jisu** Lecturer radheshyamnathjisu@gmail.com radheshyam@cuet.ac.bd	**MSc, Bangladesh (on going)** Composite Materials, Robotics

2.3 Laboratory Facilities

The department of Mechanical Engineering provides outstanding facilities for laboratory work with modern equipment to enrich the undergraduate and postgraduate engineering education of the students. The laboratories are well-equipped and are being constantly upgraded to keep pace with time. The facilities are geared towards the needs of the students in anticipation of them working in many industries, locally and abroad. The laboratory facilities provide sound environment for doing research activities at postgraduate level. Our laboratory facilities consist of following laboratories:

- Incompressible Fluid Mechanics & Fluid Machinery Laboratory
- Compressible Fluid Mechanics & Renewable Energy Laboratory
- Thermodynamics & Air Conditioning Laboratory
- Heat Transfer Laboratory
- Heat Engine & Automobile Laboratory
- Strength of Materials Laboratory
- Applied Mechanics Laboratory
- Metallurgy & Metrology Laboratory
- Computer Laboratory
- Mechatronics & Control Engineering Laboratory
- Robotics & Research Laboratory
- Postgraduate Research Laboratory
- Drawing Laboratory
- Workshop (Machine shop, Wood shop & Sheet metal shop)

2.3.1 Incompressible Fluid Mechanics & Fluid Machinery Laboratory

The laboratory contains equipment to design and conduct experiment on fluid properties, flow characteristics, and fluid machinery. Facilities are available for investigating the fundamentals of fluid statics as well as kinematics and kinetics of fluid flow to enhance the hands-on experience of our students. The Laboratory is equipped with test set-up for experiments pertinent to fluid mechanics, pumping machinery, and fluid power systems. The laboratory includes:

- Bernoulli's Apparatus
- Centrifugal pump test rig
- Reciprocating pump test rig
- Hydraulic power plant
- Radial blower test
- Series and Parallel pump test rig
- Hydraulic test bench
- Fluid friction test bench
- Laminar and Turbulent test bench
- Kaplan turbine
- Pressure calibration set
- Pelton wheel and Francis turbine
- Impact of jet

2.3.2 Compressible Fluid Mechanics & Renewable Energy Laboratory

Compressible Fluid Mechanics

Compressible fluid mechanics is the major subject of Mechanical engineering, which is involved to experiment on compressible fluid flow characteristics such as shock wave, sonic and sub sonic flow. This is the fundamental consideration to design and fabrication of nozzle, compressor and areo-foil, etc. The laboratory includes:

- Sub sonic wind tunnel
- Nozzle flow apparatus
- Nozzle performance test rig
- Centrifugal compressor rig

Renewable Energy Laboratory

Energy extracted from wind and solar are the prime need for us in the days of crisis of conventional fuel like oil and gas. From this viewpoint the performance test of PV cell and wind turbine can be done in this laboratory. This laboratory includes:

- Wind turbine test rig
- PV power generation apparatus

2.3.3 Thermodynamic & Air Conditioning Laboratory

Thermodynamics Laboratory

The terms Thermodynamics, Thermal engineering are very much significant in the field of mechanical engineering. Laboratory experiments are designed for hand-on experience to understand engineering principles related to above terms. The experiment's application includes the first law of thermodynamics, the second law of thermodynamics, properties of pure substance and calibration of different.

Air Conditioning Laboratory

The objective of this lab is to analyze the performance of an actual air the performance of an actual air measurements. Experiment on air conditioning and heat pump gives the conditioning and heat pump gives the conditioning and heat pump gives the compressor and the air conditioning system. This laboratory includes the following apparatus:

- Refrigeration cycle animation
- Air conditioning and heat pump test rig

2.3.4 Heat Transfer Laboratory

The term Heat Transfer is very much significant in the field of mechanical engineering. Laboratory experiments are designed for experiments are designed for engineering principles related to above term. The experiments application includes heat transfer application includes heat transfer heat transfer rate of various instruments which are closely related to refrigeration, air-conditioning, and engines etc. Some of the apparatuses of this laboratory are cited below:

- Thermal conductivity measuring apparatus
- Thermal radiation apparatus
- Radial heat transfer apparatus
- Fin efficiency measuring instrument
- Hot air to water heat exchanger
- Water to water heat exchanger
- Free & forced convection apparatus
- Tube side heat transfer apparatus

2.3.5 Heat Engine & Automotive Laboratory

Heat Engine Laboratory

The laboratory is used for both research and instructional purposes. Every student of mechanical engineering should have a sound knowledge about internal combustion engine. Engine structure, engine performance, and engine power system etc. of internal combustion engines are taught practically in this laboratory. It is equipped with the state-of-the-art internal-combustion engine test bed connected to a gas analyzer allowing on-line measurements of performance and emissions. Laboratory facility includes:

- 4-cyinder 4-stroke spark ignition system unit
- 4-cylinder 2-stroke spark ignition system unit
- 4-cylinder 4-stroke compression ignition system unit
- 4-cylinder 2-stroke compression ignition system unit
- Engine test bed unit
- Fuel analysis unit
- Exhaust gas analyzer
- Steam power-plant

Automotive Laboratory

The automotive laboratory supports all facets of the automotive concentration by providing a hands-on experience with vehicle components, subsystems, and performance validation. The goals of the laboratory are to provide fundamental as well as advanced knowledge for automotive engineering technology students. This Laboratory consists of the following major set-up:

- Sectional view of automotive parts
- Braking system

2.3.6 Applied Mechanics Laboratory

This laboratory helps the students in visualizing forces and different mechanism involved in engineering design. Vibration, balancing, governing etc. are very much important criterion to design and fabricate as well as to operate mechanical devices. Applied Mechanics Laboratory aims to merge the fundamental sciences with cross-disciplinary engineering fields to provide in-depth understanding to the variety of scientific problems. Some of the interdisciplinary fields considered are solid mechanics, mechanics of materials, nonlinear dynamics, etc.

Some of the important apparatus of this laboratory are:

- Tensional vibration apparatus
- Governor apparatus
- Universal vibration apparatus
- Cam and roller apparatus
- Angular acceleration measuring apparatus
- Free and forced vibration apparatus
- Centrifugal force measuring apparatus
- Static and dynamic balancing apparatus

2.3.7 Metrology & Metallurgy Laboratory

Metrology Laboratory

In the area of precision engineering, measurement plays an important role in designing and operating instruments and machineries. There are a number of dimensional metrology instruments for measuring both form and size. By doing the experiment on measurement using different precision tools the students can have the experience of practical problem-solving matters. Different measuring apparatus, among many, of this laboratory are listed below:

- Flatness
- Radius of curvature
- Angle
- Straightness
- Machine tool performance test
- Taper measuring apparatus

Metallurgy Laboratory

The metallurgy laboratory offers materials evaluation and development, and mechanical and chemical composition testing. It is because; metal plays an important role in the structural construction, fabrication of machineries for industries and transport vehicle etc. The laboratory is equipped with a full complement of sample preparation complement of sample preparation analysis of ferrous and non-ferrous alloys. This laboratory has the following apparatus:

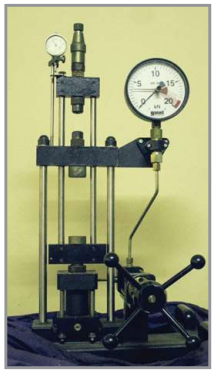
- Precision microscope
- Metal polisher
- Heat treatment furnace
- Hot plate
- Oven
- Water distiller
- Metal composition test setup
- Chemical reagents
- Precision cutter
- Micro hardness tester



2.3.8 Strength of Materials Laboratory

The basis of structural design is simply to design a component where the stress designs a component where the stress does Designing machines, structures, and vehicles, which are reliable and safe and cost effective, requires a proper knowledge of engineering load and knowledge of engineering load and The laboratory gives the opportunity to apply loads to various materials under different equilibrium conditions. This laboratory helps also students to perform tests on materials in tension, torsion, bending, and buckling. This laboratory includes:

- Universal testing machine
- Beam deflection apparatus
- Impact tester
- Hardness tester
- Resistance welding machine
- Vertical injection molding machine
- Weld analyzer



2.3.9 Computer Laboratory

A well-decorated computer laboratory with 40 computers is networked and available for use by the students. The students of the department of Mechanical Engineering gather sufficient knowledge about the computer language, computer networking and Auto CAD drawing utilizing the resources of this laboratory. The computer laboratory provides different services such as

- One computer per student
- E-mail and Internet surfing
- Learning software packages: Visual Basic course, Networking, C++ programming, MATLAB, AutoCAD, Solid Work and FORTRAN.

2.3.10 Control & Mechatronics Laboratory

Control engineering or Control systems Engineering is the engineering discipline that applies control theory to design systems with predictable behaviors. This laboratory is multi-disciplinary in nature. The activities involving with control systems engineering focus on implementation of control focus on implementation of control modeling of systems in a diverse range.

In this laboratory, students can gather huge knowledge about control engineering by using the following apparatus:

- Sensor and instrumentation system
- Robot simulation software
- PLC trainer
- PLC process
- Logic circuit trainer
- Micro controller trainer

2.3.11 Postgraduate Research laboratory

The department of Mechanical Engineering provides outstanding facilities for laboratory work with modern equipment to enrich the postgraduate engineering education of the students. The facilities are geared towards the needs of the students in anticipation of them working in many industries, locally and abroad. The laboratory facilities provide sound environment for doing research activities at postgraduate level. Our postgraduate research laboratory facilities consist of following equipment:

- Super computer
- Spectrometer
- Advanced Sub Sonic Wind tunnel

2.3.12 Workshop

The department of mechanical engineering has a well-organized workshop. It is the backbone of metal working and non-metal working manufacturing in CUET. Recently, a central modern workshop has been established inside the workshop with CNC milling machine, CNC lathe machine and pneumatic kits. For convenience, this is divided into three sections providing a good working environment. There are :

- Machine shop
- Foundry & Welding shop
- Wood shop.

Every section consists of wide variety of machinery and tools.

Machine Shop : This machine shop provides various maintenance operations as required in CUET. It helps the students to do practical classes and different project works. In this section, the available machines are

- Lathe machine
- Milling machine
- Drilling machine
- Grinding machine
- Boring machine
- Facing machine
- Shaper machine
- Slot cutting machine
- Foundry and Welding Shop
- Shear cutting machine
- Plain sheet cutter
- Angle cutter
- Bar cutter
- Melting furnace
- Drill machine
- Bench shear machine
- Arc & oxyacetylene welding
- CNC Lathe machine
- CNC Drilling machine
- Pneumatic control system

Wood Shop: It provides all of maintenance work related to wood to the residents. It also helps to conduct a practical course. In this section of workshop, following machineries and instruments are available :

- Jointer planer machine
- Band saw machine
- Thickness planer machine
- Mortise machine
- Circular saw machine
- Belt and disc sander machine

2.4 Mechanical Library

The library contributes to the students developing their information literacy, and act as a support in the learning process. The library is of primary importance for the advance of science, in direct form as a research support and, indirectly, as a teaching support. The library at department of Mechanical Engineering has a good number collection of books, conference proceedings and journals on various disciplines of Mechanical Engineering. The number of reserve of books, thesis papers, and journals is as follows.

Type of Collection	Quantity
Books	345
Journals	165
Proceedings	70
Undergraduate Project Reports	2120
Post-graduate Thesis Books	14

2.5 Collaboration with BSME

The department of Mechanical Engineering organizes daylong seminars/ workshops and science fairs in collaboration with BSME every year. Resource personnel in different disciplines of Mechanical Engineering from Mechanical Engineering from participate in the seminar to these builds a platform for experts from inside and outside the University for interchanging their knowledge. The faculties and a number of students of CUET also participate in the international conference organized by BSME held in Dhaka every year.

2.6 Research Project

The Several projects funded by different organizations, such as UGC, Directorate of Research & Extension, HEQEP and so on, have been going on in the Department of Mechanical Engineering. These projects are integral to the postgraduate and research programs at Department of Mechanical Engineering. There is a provision in each project to include a competent research assistant who is capable of working with faculties. As a postgraduate student to make an appointment early in our research project has the opportunity to involve with project as a research assistant. A few projects, among many in the last two academic years, are listed as follows –

- Recent trends in industrial and engineering applications of non-destructive testing (NDT): A case study in Chittagong zone.
- Study the effect of nano-particles on mechanical characteristics of hybrid composite.
- Development of a pump testing facilities to evaluate the efficiency and performance characteristics.
- Ni-NiO nanocomposite powders as anode material for high performance lithium-ion batteries.
- Nanoporous anode materials for high performance lithium-ion batteries.
- Environmental impact analysis of conventional brick kiln and possible improvement plant in Bangladesh.
- Investigation of the effects of ethanol-diesel blends on the performance of diesel engine.
- Performance analysis of a direct methanol fuel cell (DMFC).
- Pyrolysis of waste plastics for fuel production.
- Development of low cost direct methanol fuel cell for power generation.

Type of publication	Quantity
Journal	42
Conference Papers	52
Monograph	3
Books/Book Chapters	4

Moreover, a peer reviewed publication 'Mechanical Engineering Research Journal' is published from the Department of Mechanical Engineering annually. The ISSN of this publication is 1990-5491. We are pleased to inform that 8 volumes of this publication have already been published.

2.7 International Conference on Mechanical Engineering and Renewable Energy (ICMERE)

Department of Mechanical Engineering organizes the International Conference on Mechanical Engineering and Renewable Energy (ICMERE) biennially. The conference activities spread over 3 days. The technical program consisting of several technical sessions organized in four parallel sessions, a poster session and invited talks from top researchers in the field. The keynotes are delivered by renowned researchers from foreign and local universities. This conference provides an excellent forum for introducing current researches and creative activities on Mechanical Engineering, Renewable Energy and other related fields. This outstanding event makes a scope to promote the exchange of this outstanding event makes a scope to promote the exchange of ideas and experiences among researchers and professionals. The event reflects the pride and strength of the department of Mechanical Engineering. The 6th ICMERE was held on December 12-14, 2021 at CUET, Chittagong. It was a memorial event for CUET.

2.8 Co-Curricular Activities

Success in organizations requires not only high intellect but also all-round personality and interpersonal skills. The co-curricular activities designed by the department of Mechanical Engineering aims to enhance social interaction, leadership, healthy recreation, team-spirit, and self-discipline. The department maintains a healthy social life. Many social functions like welcome ceremony for fresher's and farewell ceremony for outgoing students besides cultural programs, such as football games, cricket, debate, seminar, blood donation, etc. are organized under the banner of Mechanical Association instructed by the department of Mechanical Engineering.

2.8.1 ROBORACE Competition

Department of Mechanical Engineering organized National Roborace Competition. Several teams from different universities participated with their latest line tracking robot. 3 days long program of Roborace competition was ended up with a declaration of the next ROBORACE Competition in the near future. The 1st National Roborace Competition was held on December'2011 at CUET.

2.8.2 ECO-run Contest

ECO-run, Bangladesh is the concept of a fuel-efficient vehicle design contest and exhibition at national level of Bangladesh, to be held once a year. We appreciate our students of the department of Mechanical Engineering, CUET who turned their dream into reality by participating on the test run with their cars. Final Competition was held on March 15, 2013. The 4 wheel car placed the 2nd position and 3 wheel car placed the 3rd position.

2.9 Training & Tour:

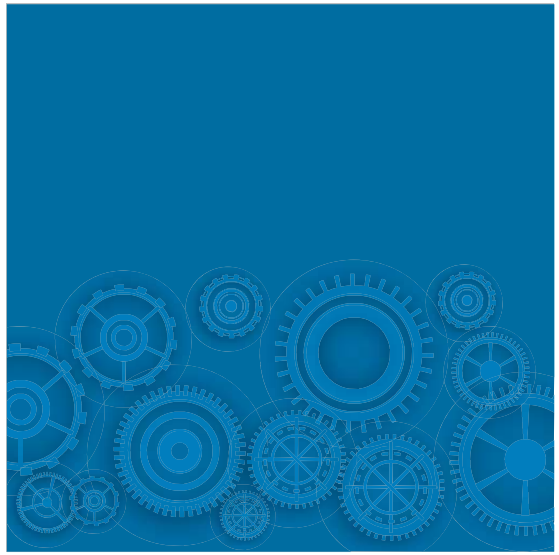
To gather practical ideas and verify their theoretical knowledge the department arranges the industrial attachment as well as, the study tours for the students to the various reputed organizations such as BSRM, RSRM, Aftab automobiles, Progoti Industries Ltd., BITAC, Rozan Thermal Power Plant, RPCL, YOUNGONE BD, Milners Pump, Chittagong port, Bangladesh Railway, Bangladesh Navy, Dry Dock, Gazi Wires, Aramit Group, Western Marine Shipyard, Chittagong Port, National Tubes, Honda etc.

2.10 Bureau of Research Testing and Consultancy (BRTC)

The Department of Mechanical Engineering of CUET is well reputed not only for the educational excellence but also because of its commitment to the industrial development of the country. The department of Mechanical Engineering of CUET is actively engaged with the BRTC (Bureau of Research, Testing and Consultancy), which serves the public, semi-public, non-government and autonomous industries for their product development and maintenance works. A handsome number of test and consultancy works, such as metal test for mechanical properties, calibration of different meters, tanks, and machineries of different recognized industries, inspection of different capital machines installed in different factories, are accomplished by the faculties of the department of Mechanical Engineering every year. Department of Mechanical Engineering provides testing consultants with advanced testing skills and techniques in a wide range of situations. Consultancy and Testing facilities are available in the area of :

- Engineering Materials
- Industrial Meters and Valves
- Strength of Material
- Fluid Machinery
- Heat Transfer
- Automobile
- Thermodynamics
- Industrial Capital Machineries
- Renewable Energy
- Metallurgy & Metrology
- Industrial Management
- Air Conditioning
- Heat Engine
- Control Engineering
- Vehicle Testing

Rules & Regulations



Academic Rules and Regulations for the Undergraduate Students

[Effective from the Level-1 Term-I of Session 2012-13 and onwards]

CONDUCT OF ACADEMIC PROGRAMS

(For undergraduate studies)

1.0 Definitions:

In these rules and regulations, unless the context otherwise requires:

1.1 "University" means the Chittagong University of Engineering & Technology abbreviated as CUET;

1.2 "Rules and Regulations" means Academic rules and regulations;

1.3 "Syndicate" means the Syndicate of the University;

1.4 "Academic Council" means the Academic Council of the University;

1.5 "Academic Committee" means Academic Committee for the Undergraduate Studies of Degree Awarding Departments as provided in Article 26 of the Act as well as Article (3) of the First Statutes;

1.6 "Vice-Chancellor" means the Vice-Chancellor of the University;

1.7 "Dean" means the Head of a Faculty of the University;

1.8 "Registrar" means the Registrar of the University;

1.9 "Department" means concerned Academic Department of the University;

1.10 "Head" means the Head of the Academic Department;

1.11 "Chairman" means the Chairman of the Examination Committee of a department of the University;

1.12 "Controller" means the Controller of Examinations of the University;

1.13 "Equivalence Committee" means the Equivalence Committee of the University;

1.14 "Level" means an academic year, consisting of Term-I and Term-II.

1.15 "Term" means Term-I or Term-II consisting of 18 weeks in each Term.

1.16 "Self Study Examination" means an examination is given for conducting examination of failed course (s) after one week of Term-II final examination results.

1.17 "Student" means a student admitted in any Degree awarding Department of the University.

1.18 "Course system" means pass or fail on course basis.

1.19 "Failed courses" means the courses registered but not appearing at the examination or not passed after appearing at the examination.

1.20 "Discontinuity" means failure to appear in all courses (theory and sessional) in a particular semester/level.

2.0 Departments:

2.1 Degree Awarding Departments (According to Department Code):

The University shall have the following Degree Awarding Departments:

(i) Department of Civil Engineering (01);
(ii) Department of Electrical & Electronic Engineering (02);
(iii) Department of Mechanical Engineering (03);
(iv) Department of Computer Science & Engineering (04);
(v) Department of Urban and Regional Planning (05);
(vi) Department of Architecture (06);
(vii) Department of Petroleum and Mining Engineering (07);
(viii) Department of Electronics and Telecommunication Engineering (08);
(ix) Department of Mechatronics & Industrial Engineering (09);
(x) Department of Water Resources Engineering (10);
(xi) Department of Biomedical Engineering (11);
(xii) Department of Material Science and Engineering (12);
(xiii) Any other Department to be instituted by the Syndicate on the recommendation of the Academic Council.

2.2 Teaching Departments:

The University shall have the following Teaching Departments:

(i) Department of Architecture;
(ii) Department of Biomedical Engineering
(iii) Department of Chemistry;
(iv) Department of Civil Engineering;
(v) Department of Computer Science & Engineering;
(vi) Department of Electrical and Electronic Engineering;
(vii) Department of Electronics and Telecommunication Engineering;
(viii) Department of Humanities;
(ix) Department of Mathematics;
(x) Department of Mechanical Engineering;

(xi) Department of Mechatronics and Industrial Engineering;
(xii) Department of Material Science and Engineering;
(xiii) Department of Petroleum and Mining Engineering;
(xiv) Department of Water Resources Engineering;
(xv) Department of Physics;
(xvi) Department of Urban and Regional Planning;
(xvii) Department of Disaster Engineering and Management;
(xviii) Department of Nuclear Engineering;
(xix) Any other Department to be instituted by the Syndicate on the recommendation of the Academic Council.

2.3 Degrees To Be Offered :

The University shall offer courses leading to the award of the following degrees:

i) Bachelor of Science in Civil Engineering, abbreviated as B. Sc. Engineering (Civil Engineering).
ii) Bachelor of Science in Computer Science & Engineering, abbreviated as B. Sc. Engineering(Computer Science & Engineering).
iii) Bachelor of Science in Electrical & Electronic Engineering, abbreviated as B. Sc. Engineering (Electrical & Electronic Engineering).
iv) Bachelor of Science in Mechanical Engineering, abbreviated as B. Sc. Engineering (Mechanical Engineering).
v) Bachelor of Architecture, abbreviated as B. Arch.
vi) Bachelor of Urban and Regional Planning, abbreviated as BURP.
vii) Bachelor of Science in Petroleum and Mining Engineering, abbreviated as B. Sc. Engineering (Petroleum and Mining Engineering).
viii) Bachelor of Science in Electronics and Telecommunication Engineering, abbreviated as B. Sc. Engineering (Electronics and Telecommunication Engineering).
ix) Bachelor of Science in Mechatronics and Industrial Engineering, abbreviated as B. Sc. Engineering (Mechatronics and Industrial Engineering).
x) Bachelor of Science in Water Resources Engineering, abbreviated as B. Sc. Engineering (Water Resources Engineering).
xi) Bachelor of Science in Biomedical Engineering, abbreviated as B. Sc. Engineering (Biomedical Engineering).
xii) Bachelor of Science in Material Science and Engineering, abbreviated as B. Sc. Engineering (Material Science and Engineering)
xiii) Any other degree that may be awarded by a Department on the approval of the Syndicate upon the recommendation of the Academic Council.

3.0 Student Admission, Equivalence and Admission on Transfer:

3.1 The four academic years of study for the degree of B. Sc. Engineering and BURP shall be designated as Level-1 class, Level-2 class, Level-3 class and Level-4 class in succeeding higher Levels of study. The five academic years of study for the degree of B. Arch shall be designated as Level-1 class, Level-2 class, Level-3 class, Level-4, and Level-5 class in succeeding higher Levels of study. Students shall be admitted into the Level-1 class.

3.2 An Admission Committee shall be formed in each academic session by the Academic Council for admission into Level-1 B. Sc. Engineering, BURP and B. Arch class, vide Article 42 of the University Act.

3.3 According to Article 42(2) of this University Act, candidate for admission into the Level-1 class must have passed the H.S.C. Examination from a Higher Secondary Education Board in Bangladesh (after 12 years of schooling) with Physics, Chemistry and Mathematics as his/her subjects of Examination or any examination in Higher Secondary Level of examination recognized as Equivalent there to, and must also fulfil all other requirements as may be prescribed by the Admission Committee.

3.4 As specified in Article 42(1) of this University Act, the rules and conditions for admission into various courses of studies of Departments shall be framed by the Academic Council on the recommendation of the Admission Committee.

3.5 All candidates for admission into the courses of B. Sc. Engineering, BURP and B. Arch. must be the citizens of Bangladesh unless the candidature is against the seats which are reserved for foreign students. Candidates for all seats, except the reserved ones, if any, shall be selected on the basis of merit. The rules for admission into the reserved seats (for foreign students & tribal), if any, shall be framed by the Academic Council on the recommendation of the Admission Committee.

3.6 No candidate shall be admitted in the Level-1 class after the beginning of the corresponding session, i.e., when the classes start.

3.7 List of newly admitted students shall be notified in the University notice Board as well as in the University Website before commencement of the classes.

3.8 If any newly admitted student fails to register the courses and to attend the classes within the first two weeks time after the start of classes, he/she will not be allowed to attend his/her classes at Level-1 course(s) but his/her admission into the Level-1 of the respective academic session will remain valid up to six weeks.

3.9 If any student fails to report within the first six weeks' time after the start of classes, his/her admission shall be cancelled.

4.0 Method of offering Course and Instruction:

The undergraduate curricula of this university are based on course system. The salient features of course system are:

4.1 The Number of regular theoretical courses and the related examination papers shall not exceed six in each Term.

4.2 Provision for continuous evaluation of student's performance, through attendance, class test, sessional class, etc.

4.3 Evaluation of the performance of course/courses by using Letter Grades and Grade Points instead of numerical marks;

4.4 Provisions for Optional/Elective courses may be available at any Level of B. Sc. Engineering, BURP and B. Arch. Courses.

4.5 In the curriculum, besides the professional courses pertaining to each discipline, there is an emphasis on acquiring knowledge in basic sciences, humanities and social sciences. Emphasis shall be given to introduce courses dealing with professional practices, project planning and management, socio-economic and environmental aspects of development projects, communication skills, etc.

5.0 Academic Calendar :

5.1 Number of Terms in an Academic Year (Level).

There shall be Two Terms (Term-I, Term-II) in an academic year (designated as Level). In addition, Self Study examination will be held for conducting examinations of failed course(s). The Self Study examination will be held after one week of Term-II results publication. Notification of the examination will be circulated before two weeks of the Self Study examination.

5.2 Eligibility for Self Study Examination.

A student shall be eligible for appearing at the Self Study examination if he/she attends at least 60% classes of a particular course.

5.3 Duration of Terms and Rules for Conducting Course(s):

[Amendment done by Academic Council (Vide: 90/1)]

The duration of each of Term-I and Term-II will be used as follows:

A. Term-I	
Classes	**13 weeks**
Mid Term Break (Generally after 50% of the Term duration)	1 week
Preparatory Leave for Examination	1 week
Term Final Examination Duration (6 days interval/course)	*4 weeks 1 day*
Total-A	**19 weeks 1 day**
B. Inter Term Break**	**1 week**
C. Term-II	
Classes	**13 weeks**
Mid Term Break (Generally after 50% of the Term duration)	1 week
Preparatory Leave for Examination	1 week
Term Final Examination Duration (6 days interval/course)	*4 weeks 1 day*
Total-C	**19 weeks 1 day**
D. Inter Level Break including Publication of Results & course registration for Self Study Examination	3 weeks
E. Ramadan, Puja, Winter Vacation*** and other Vacations throughout the Academic Year	8 weeks 5 days
F. Compensatory Class (es)	1 week
Total (A+B+C+D+E+F) =	**52 weeks**

* Design for 05 theory courses. Departments having 6 (Six) theory courses in a Term shall adjust 1 week from the duration for Compensatory Class(es).

**Term-I result is to be published by 4 weeks after the Term-I final examination.

*** 10 days for winter vacation will be scheduled in the month of December considering the academic calendar declared in advance every year.

5.4 A student shall be allowed to appear at Self Study examination for a maximum of 5 (five) failed course(s) retaining his/her previous attendance and class test marks of a particular course.

[Amendment done by Academic Council (Vide: 90/1)]

A student shall be allowed to appear at Self Study examination for a maximum of 5 (five) failed course(s) of Term 1 and Term 2 of the same level retaining his/her previous attendance and class test marks of a particular course. In addition, a student shall be allowed to register another 2 (two) failed course(s) in any other regular Term as Backlog course or he/she shall be allowed to appear at Self Study examination for another 2 (two) failed course(s) in the same academic year. i.e. A student shall be allowed to appear in examination for a maximum of 17 courses in one academic year. However, this restriction, of registering 17 courses, is not valid for students completed Level 4 Term 2.

5.5 The maximum grade obtainable in any course by a student in the Self Study examination shall be 'B'.

5.6 A student shall not be allowed to register courses of Level-3, unless he/she passes all the prescribed courses of Level-1 for B.Sc. Engineering and BURP. Similarly, a student shall not be allowed to register courses of higher Levels (Term I and Term II), unless he/she passes all the prescribed design studio (I-X) and Visual Communication courses of different Levels for B. Arch.

[Amendment done by Academic Council (Vide: 91/5)]

"A student shall not be allowed to register courses of Level-3, unless he/she passes all the prescribed courses of Level-1 for B.Sc. Engineering and BURP."–is omitted from the Academic Rules and Regulations.

[Amendment done by Academic Council (Vide: 104/15)]

"A student shall not be allowed to register courses of higher Levels (Term I and Term II), unless he/she passes all the prescribed design Studio (I-X) courses of different Levels for B. Arch."–is amended to the Academic Rules and Regulations.

5.7 A student not eligible/not intended for appearing at the Self Study Examination shall have to register the failed course (s) in regular Term. He/she shall repeat the course(s) like a regular student with prior application to the Head of the Department concerned. In that case, the maximum grade obtainable in any course by the student shall be 'B'.

5.8 The Head of the Department will propose through Dean of the respective Faculty an academic schedule for all academic Levels to the Academic Council for approval and will announce the same before the starting of the classes.

5.9 In case a student fails in sessional course(s) he/she shall have to register the same as a regular student. In that case, the maximum grade obtainable in any course by the student shall be 'B'.

6.0 Duration of Course and Course Structure :

6.2 The curricula of the B. Sc. Engineering, BURP and B. Arch. degree in the different Departments shall be, as proposed by the Academic Committee for Undergraduate Studies and approved by the Syndicate on recommendation of the Academic Council.

6.3 The Academic Committee for Undergraduate Studies shall review the curricula at least once in every academic Level and put forward the recommendations to the Academic Council.

6.4 Contact hour(s) of the teaching load(s) shall have to counted according to the following guidelines :

SL. No.	Nature of Course	Contact Period (in a Term)	No. of Credits
1	Theory Lecture	1 hour per week	1.00
2	(i) Laboratory (ii) Sessional (iii) Design (iv) Design Studio (for B. Arch)	3/2 hours per week 2 hours per week 3 hours per week 2 hours per week for Level-1 1.5 hours per week for level-2, 3 and 4 1.25 hours per week for level-5	0.75 1.00 1.50 1.00 1.00 1.00
3	Project and Thesis	3/2 hours per week 3 hours per week 6 hours per week	0.75 1.50 3.00
4	Field work	2 weeks of field work (Survey)	1.50
5	Industrial training	3 weeks in industry	1.50
6	Professional Training (for BURP)	4 weeks	Non credit
7	Professional Training (for B. Arch.)	8 weeks	Non credit

6.5 Field work (Survey)/Industrial Training/ Professional Training should be completed within the time allowed for the Term. For that, if necessary, rescheduling of classes can be done in consultation with Dean of the respective Faculty.

6.6 Minimum credit hour requirements for the awards of bachelor's degree in Engineering, URP and Architecture will be decided by Academic Committee subject to the approval of Academic Council. However, at least 155 credit hours for B. Sc. Engineering, 159 credit hours for BURP, and 191 credit hours for B. Arch. must be earned to be eligible for graduation.

6.7 The total number of credit hours for which a student can register in each regular Term shall be around 25.

6.8 The total contact period for students including lecture and lab/sessional shall be between 25 and 35 periods per week, each period being of 50 minutes duration. Normally, there shall be five working days in a week and the working days will be counted as per the calendar days.

6.9 In each degree awarding Department, a teacher to be nominated by the Head of the Department shall act as Course Co-ordinator in each Level. The Course Coordinator of Level-4/ Level-5 shall also be the Member Secretary to the Academic Committee.

6.10 A course plan for each course showing the details of lectures is to be announced by the concerned teacher at the beginning of the Term.

6.11 Credit in any theory subject/course shall not exceed 4 and in sessional/laboratory/design-subject/course it shall not exceed 1.5 for B.Sc. Engineering. However, for B. Arch and BURP the Credit in any theory subject/course shall not exceed 4 Credit and the credit in sessional/design studio courses shall be as specified by the Academic Curricula.

6.12 Project and Thesis is to be done in Level-4 as compulsory course. The total number of credits and distribution of credits for project and thesis in two terms of Level-4 will be as incorporated in approved curriculum for B. Sc. Engineering and BURP; however, for B. Arch., Project and Thesis is to be done in Level-5 as compulsory course. The total number of credits and distribution of credits for project and thesis in two terms of Level-5 will be as incorporated in approved curriculum.

6.13 The assessment in laboratory/sessional courses shall be made through observation of the student at work in class, viva-voce, quiz/ jury board (for Design Studio), etc. Assessment of result of each sessional class shall be posted to the sessional card as well as to the Display Board before the next class.

7.0 Course Designation and Numbering System :

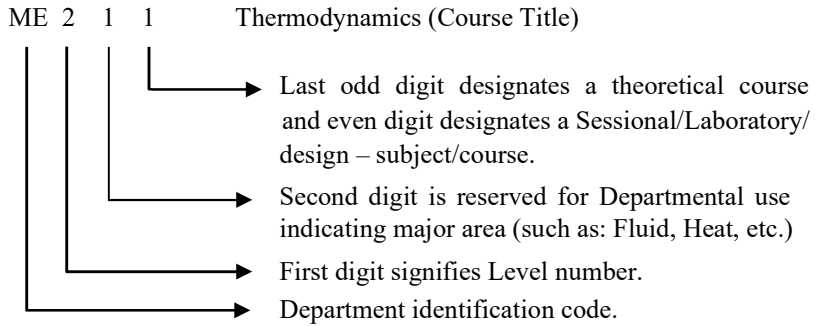
Each course shall be designated by a two to four letter word identifying the Department which offers it followed by a three-digit number with the following criteria.

7.1 The first digit shall represent the Level in which the course is taken by the students.

7.2 The second digit shall be reserved for Departmental use for such things as to identify different areas within a Department.

7.3 The last digit shall represent a theoretical course when it is an odd digit and a Sessional/Laboratory/Design–Subject/course when it is even.

The course designation system is illustrated by one example as shown below:



Ex. ME 2 1 1 means	ME	for	Mechanical Engineering
Or ME 2 1 2	2	for	2nd Level
	1	for	Thermodynamics
	1(odd)	for	Theory courses
	2 (Even)	for	Sessional/Laboratory/Design – Subject/course

8.0 Course Offering and Instruction:

The medium of instructions is English. The compulsory and optional courses at different Levels shall be offered according to the approved curricula. The optional course(s) shall have to be registered with the prior approval by the Head of the Department.

9.0 Registration Requirements:

Every regular student, if he/she wants to study, shall have to register the course(s) before the beginning of the class of each term of each level.

9.1 Registration/Form Fill up Procedure for Regular and Self Study Students:

a) The Registration and Form fill up of examination shall have to be conducted by the Department. Each student needs to fill up his/her form to appear at the examination. The date, time and venue for filling up the forms to appear at the examination will be announced in advance by the Office of the Controller of Examinations and the date, time and venue for course registration will be announced by the Registrar's Office. A student shall have to pay fine as described below for late registration beyond the time/schedule as declared by the Office of the Registrar:

i) A student shall be allowed to register course(s) up to one week after starting classes of the Term with a late fine of Tk. 500.00.

ii) For a period of more than one week but less than/equal to two weeks after stating classes of the Term, a student shall be allowed to register course(s) with a late fine of Tk. 1000.00.

iii) A fine of Tk. 2000.00 shall have to be paid by a student who will be registering course(s) in the period of more than two weeks but less than/equal to 40% of the Term duration.

iv) A student shall not be allowed for registration of any course after 40% of the Term period elapsed. But, this may be relaxed for students completing Level 4 Term-II for B. Sc. Engineering and BURP, and Level 5 Term-II for B. Arch.final examination with recommendation from the Adviser and the Head of the Department, and a late fine of Tk. 5000.00 for each such registration.

b) If a student of Level-1 fails in all theory courses registered by him/her and obtains "F" grade in each of the courses and fails to earn any credit against theory courses but may/may not earn credit against sessional course/courses, he/she shall have to register the same theory/sessional course(s) in Level-1 of the next Academic Session. The maximum grade obtainable by a student in any re-registered theory course will be "B". However, grade obtained in sessional course/courses will be retained. For the re-registration of these courses an elapse of time for previous Academic Year equivalent to one Academic Year will be considered and this period will be deducted from the total period of time allowed for the completion of B. Sc. Engineering. BURP and B. Arch. degrees as mentioned in article 13.0 of the Academic Ordinance.

c) Registration for Self Study Students:

A student shall register course(s) to appear at the Self Study examination at least two days before starting of the examination of a particular course. The maximum number of courses to be registered by a student shall be Five (5). The maximum duration of the self Study examination shall be two weeks. The date, time and venue for filling up the forms to appear at the examination will be announced in advance by the Office of the Controller of Examinations and the date, time and venue for course registration will be announced by the Registrar's Office.

9.2 Appointment of Adviser:

One adviser will be appointed for each student by the Department who will advise the student about the courses to be registered by the student. The adviser will discuss with the students about his academic program and then decide the number and nature of courses for which he can register. However, it is the student's responsibility to keep contact with his adviser, who will review and eventually approve the student's specific plan of study and check on subsequent progress. The number of students under each adviser will be decided by the Head of the Department concerned.

[Amendment done by Academic Council (Vide: 91/5)]

(i) Students have to get approval (signature) in the registration card from his/her adviser before submitting to department. The head of the department will then sign and send the registration card to Academic Section.

(ii) A Departmental Academic Monitoring Committee shall be formed to help the academically weak students as well as to strengthen the departmental advisory process.

9.3 Limits on Credit Hours:

A student must be enrolled for the requisite number of credits as mentioned in article 6.6 and 6.7

9.4 Withdrawal from a Semester:

If a student is unable to complete any Term (Term-I &/or Term-II) due to illness, accident or any other valid reason etc., he/she may apply to the Registrar through the concerned Head of the department for total withdrawal from the Term before the start of Term Final Examination.

9.5 Striking off the Names:

The names of the students shall be struck off and removed from the rolls of the university on the following grounds:

9.5.1 Withdrawal of names from the rolls of the University after having cleared all University fees, Hall and other dues to the University.

9.5.2 Failure to earn required credits for graduations as outlined in the respective curriculum and/or to earn CGPA requirement as per 11.4 within the maximum allowed time of seven (7) academic years for B.Sc. Engineering and BURP and eight (8) academic years for B. Arch.

9.5.3 Admission of a newly admitted student in the Level-1 class will be cancelled, if he/she fails to report within first six consecutive weeks after the beginning of the class.

10.0 Grading System:

10.1 The letter grade system shall be used to assess the performance of the student and shall be as follows:

Numerical Grade	Letter grade	Grade point
80% or above	A+ (A Plus)	4.00
75% to less than 80%	A (A Regular)	3.75
70% to less than 75%	A- (A Minus)	3.50
65% to less than 70%	B+ (B Plus)	3.25
60% to less than 65%	B (B Regular)	3.00
55% to less than 60%	B- (B Minus)	2.75
50% to less than 55%	C+ (C Plus)	2.50
45% to less than 50%	C (C Regular)	2.25
40% to less than 45%	D	2.00
Less than 40%	F	0
Not registered in the Registration.	I	-

A grade 'X' shall be awarded for courses (like project/Thesis, design, etc.) in the Term-I, which will continue through to the next Term-II.

10.2 The minimum passing grade in a theory course shall be D and the minimum passing grade in a Laboratory/Sessional/Project/Thesis, field work course/Industrial Training (henceforth referred to as sessional course) will be C.

[Amendment done by Academic Council (Vide: 104/15)]

The minimum passing grade in a theory course shall be D and the minimum passing grade in a Laboratory/Sessional/Design/Design Studio/Project and Thesis, Field work course/Industrial Training (henceforth referred to as sessional course) will be C.

10.3 Calculation of GPA:

Grade Point Average (GPA) is the weighted average of the grade points obtained in all the courses passed/completed by a student in a Term. 'F' grades will not be counted for GPA calculation. GPA of a Term will be calculated as follows:

$$\text{GPA}=\frac{\sum_{i=1}^{n} C_i G_i}{\sum_{i=1}^{n} C_i},$$

where,

n is the number of courses passed by the student;

$\mathbf{C_i}$ is the number of credits assigned to a particular course i;

And $\mathbf{G_i}$ is the grade point corresponding to the grade awarded for i-th course.

The Cumulative Grade Point Average (CGPA) gives the cumulative performance of the student from first Term up to any other Term to which it refers and is computed by dividing the total grade points ($\Sigma C_i G_i$) accumulated up to the date by the total credit hours (ΣC_i).

$$\text{CGPA}=\frac{\sum_{i=1}^{n} C_i G_i}{\sum_{i=1}^{n} C_i}$$

Both GPA and CGPA will be rounded off to the second place of decimal for reporting.

10.4 Distribution of marks for a given course will be as follows:

(i)Theory courses :

Class participation and attendance Class tests/Class assessment Term Final Examination (3 hours duration)	10% 20% 70%
Total	100%

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(ii) **Laboratory/Sessional/Design–subject/work courses:**

a) B.Sc Engineering

Quizzes	15%
Viva-voce	15%
Class performance including reports	60%
Attendance	10%
Total	100%

b) BURP

Quizzes / Drawing Evaluation / Presentation	15%
Viva-voce	15%
Class performance including reports	60%
Attendance	10%
Total	100%

c) B.Arch.

Attendance	10%
Jury (report, preliminary Jury and final Jury)	90%
Total	100%

(iii) Project/Thesis:

a) B. Sc. Engineering and BURP:

Viva-voce	30%
External examiner	20%
Supervisor (internal examiner)	50%
Total	100%

b) B. Arch.:

Attendance	10%
Jury (report, preliminary Jury and final Jury)	90%
Total	100%

10.5 Basis for Awarding Marks for Class Participation and Attendance will be as Follows:

Attendance	Marks
90% and above	10%
85% to less than 90%	9%
80% to less than 85%	8%
75% to less than 80%	7%
70% to less than 75%	6%
65% to less than 70%	5%
60% to less than 65%	4%
To less than 60%	0%

10.6 Class Tests:

10.6.1 The number of Class Tests of a course shall be 'n+1', where 'n' is the number of credits of the course. Evaluation of the performance in the class test will be on the basis of the best 'n' number of class tests.

10.6.2 Duration of each Class Test shall not exceed 20 minutes.

10.6.3 For convenience of conducting the Class Tests a half an hour time slot should be kept at the beginning of each working day.

10.6.4 The dates for the Class Tests shall be fixed by the Course Co-ordinator and shall be announced accordingly.

10.6.5 All Class Tests shall be of equal value. The result of each individual Class Test shall be posted to Display Board for information of the students before the next Class Test is held.

10.6.6 The marks of the Class Tests shall be submitted to the Head of the Department before beginning of preparatory leave.

10.7 A student will be given "F" grade in any course if he/she fails in final examination.

11.0 Earned Minimum CGPA for awarding Degree:

11.1 The courses in which a student has obtained 'D' or a higher in theory and 'C' or higher in sessional/laboratory/Project/Thesis/ Field work/ Industrial Training Grade will be counted as credits earned by him/her. Any course in which a student has obtained 'F' grade will not be counted towards his/her earned credits.

11.2 A student, who obtains an 'F' grade in any course(s) in any Term, will have to repeat the course(s). If a student obtains an 'F' in an optional course(s), he/she may choose to repeat the course(s) or take substitute course(s), if available.

11.3 'F' grades will not be counted for GPA calculation. 'F' grades shall not be reflected in Transcript.

[Amendment done by Academic Council (Vide: 111/4)]

From academic year 2018-19, if a student doesn't pass his/her regular Term-1, Term-2 and self-study examination, 'F' grades shall be reflected in his/her Transcript.

11.4 The minimum CGPA requirement for the award of Bachelor of Engineering and URP Degrees is 2.25 and that for Bachelor of Architecture is 2.20. Candidates for Bachelor's degree in Engineering, URP and Architecture shall be awarded Honors if he/she obtained CGPA 3.75 or higher.

12.0 Awards for Academic Excellence:

12.1 Chancellor's Award

Candidates for Bachelor's degree in Engineering, URP and Architecture shall be awarded the Chancellor's Award if their CGPA is 4.0.

12.2 Dean's Award

Candidates for Bachelor's degree in Engineering, URP and Architecture shall be awarded the Dean's Award if their CGPA is 3.75 or higher.

13.0 Time Limits for the Completion of Bachelor's Degree:

A student must complete all requirements for the fulfillment of degree within a maximum period of seven academic years for B. Sc. Engineering and BURP and eight academic years for B. Arch. This includes discontinuity due to any cause (fail, expulsion, not appearing in the examination etc). But exception may be done only for those students who have passed all prescribed Sessional courses. In such cases, a prior approval of the Academic Council with recommendation from the Head of the department concerned shall be needed. In this connection, a student shall have to pay the registration fee as prescribed by the Academic Council.

14.0 Industrial/Professional Training Requirements:

Depending on each Department's own requirement a student shall have to complete a prescribed number of days of industrial/professional training in addition to minimum credit and other requirements, to the satisfaction of the Department.

15.0 Publication of Results:

15.1 A student who successfully complete the prescribed courses of all the Terms and all academic requirements for fulfillment of degrees of Bachelor's will have to apply to the Controller of Examinations through the Head of the Department for Graduation.

15.2 The Controller of Examinations shall publish the result.

15.3 Provisional degree will be awarded on completion of credit and CGPA requirement, by the Academic Council.

15.4 Students of regular batch who have completed their all courses in regular Level-4/ Level-5 Term-II examination or in respective Level-4/ Level-5 Self Study examination, will be eligible to be included in the merit list of concerned academic session, provided that they must have completed and passed their project/thesis course within 45 days from the last day of Level-4/ level-5 Self Study examination. The irregular or included students from the previous academic rules and regulations shall not be considered as regular students.

ORDINANCE RELATING TO THE STUDENTS' DISCIPLINE

A. ORDINANCE REGARDING GENERAL DISCIPLINE

1. According to the provisions laid down in article 32 of the Chittagong University of Engineering & Technology act, there shall be a students' discipline committee to supervise and control the residence and discipline of the students of the university.

The committee shall consist of the following members:

(i)	The Vice-Chancellor	Chairman
(ii)	Pro-Vice Chancellor	Member
(iii)	Two Deans, to be nominated by the Academic Council.	Members
(iv)	Two Heads of Departments to be nominated by the Academic Council.	Members
(v)	Two Provosts to be nominated by the Academic Council.	Members
(vi)	One member of the Syndicate not receiving salary from University, to be nominated by the Syndicate.	Member
(vii)	The Director of Students' Welfare (DSW)	Member-Secretary

2. The Chairman shall convene the meeting of the Committee as and when required and five members shall form a quorum. The term of nominated members shall be two years, but shall continue till successors are nominated.

3. Members of the Committee other than the ex-officio members shall ordinarily hold office for two academic sessions but they shall continue to be members till their successors are nominated and they shall be eligible for reappointment.

4. (a) All incidents which appear to be acts of indiscipline and misconduct committed by any student including immediate action taken, if any, shall be reported to the Vice-Chancellor by the Provosts through the Director of Students' Welfare in respect to indiscipline and misconduct in the Halls of Residence and their premises; and by the Heads of Department in respect of indiscipline and misconduct in class rooms, laboratories, workshops, library and all parts of the Academic premises, by the invigilator through the Chief Invigilator in respect of indiscipline and misconduct in the examination halls/rooms; and by the person concerned from among the students and teachers, officers and employees of the University in respect of misconduct committed outside the Halls or academic premises but within the campus or outside the University.

(b) All acts of indiscipline / misconduct, whether reported verbally or in written form or even heard by any authority, as mentioned in article 4 (a) of this ordinance shall be taken into due consideration and shall be settled by the respective authority within a maximum period of 3 (three) weeks. All authorities except the first three as described in column 1 of 5(b) (Students' Discipline Committee, Vice-Chancellor and Director of Students' Welfare) shall take immediate action against acts of indiscipline/misconduct within their respective jurisdiction after proper verification. All such individual or minor cases/incidence(s) shall be reported to the DSW for proper recording as well as for reporting to the Students' Discipline Committee.

5. (a) A student who neglects his studies, disobeys and/or denounces orders, regulations, statutes, ordinances and Acts of the University, shows misbehavior towards the members of the staff or officers or teachers of the University or commits any other offence which will be deemed by the Vice-Chancellor or Director Students' Welfare or Teachers of the University as misconduct and breach of discipline, will be liable to disciplinary action which may range from warning, imposition of fines, suspension to expulsion for good from the University, depending on the magnitude of the offence as will be deemed fit by the authorities competent to take disciplinary action as defined in 5(b).

(b) Authorities to take disciplinary action with their respective powers to the extent to which they can impose punishment on any student or group of students are:

Column-1	Column-2	Column-3
Authority for taking disciplinary Action	**Power**	**Appellate Authority**
Students' Discipline Committee	Warning, imposing fine, suspension for any length of time, expulsion for good.	Academic Council
Vice-Chancellor	Warning, imposing fine, suspension up to six months.	Students' Discipline Committee
Director of Students' Welfare	Warning, imposing fine up to Tk. 500/-, suspension and expulsion from the Halls.	Vice-Chancellor
Provosts (On students of his Hall of Residence)	Warning, imposing fine up to Tk. 500/-, suspension and expulsion from the Hall for a period of one year.	Director of Students' Welfare
Heads of Department (On students of his Department)	Warning, imposing fine up to Tk. 500/- with a report to the Director of Students' Welfare for record.	Vice-Chancellor
Assistant Provost	Warning, imposing fine up to Tk. 100/- with a report to the Director of Students' Welfare for record.	Director of Students' Welfare.
Teachers & Director of Physical Education	Warning with a report to the concerned Head & Director of Students' Welfare respectively.	Head of the concerned Department & Director of Students' Welfare respectively.

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6. If the Vice-Chancellor feels that the action taken against a student or a group of students by any of the above authorities other than Students' Discipline Committee on an offence brought to him is not appropriate or that no action has been taken on any offence observed by him, he will take appropriate disciplinary action against a student or a group of students. If, however, in any case of breach of discipline the Vice-Chancellor is of the opinion that a punishment more than a suspension of six months may be required, he shall refer the matter to the Students' Discipline Committee for a decision.

7. A student or a group of students against whom an action has been taken by appropriate authority mentioned in Column 1 of Section 5(b) may prefer an appeal to the appropriate appellate authority mentioned in column 3 of Section 5(b). The appeal shall have to be lodged within 15 days of the imposition of disciplinary action.

8. The Director of Students' Welfare (DSW) will be responsible for enforcement of the disciplinary action taken against a student or a group of students. He shall maintain a register and shall record therein all actions taken against a student for indiscipline and misconduct and also shall record in all character certificates issued by the Director of Students' Welfare to offenders, those actions taken against them if so indicated by the Vice-Chancellor and the Students' Discipline Committee unless allowed to be expunged/condoned by the Syndicate on written prayer from the offenders.

9. The Director of Students' Welfare shall not record the punishment like warning, undertaking of the student and/or the guardian imposed by any authority. The monetary fines imposed by any authority except Students Discipline Committee shall not be recorded in the character certificate of the offended student(s).

10. In an emergency, the Director of Students' Welfare may request any teacher, officer & employees of the University to help him in the discharge of his duties in the University or outside at all hours and it shall be the duty of the teachers, officers or employees concerned to give him every reasonable assistance.

11. No student or students of the University shall declare a strike at the University nor shall a student interfere with the free movement of the University students willing to attend classes, laboratories, library and field work; nor shall students organize and/or stage any demonstration in any part of the University campus or its neighborhood.

    A student or a group of students found guilty of violation of the provisions of this Section will be liable to disciplinary actions including expulsion from the University. Students absenting themselves from the classes on the days of strike will lose their percentage of attendance and will be liable to forfeiture of their scholarships and stipends and to other disciplinary actions as the authorities may think fit.

12. The Vice-Chancellor at any time may stop temporarily or permanently publication of any journal or magazine or any printed or cyclostyled matter which he thinks detrimental to the general interest of the University.

13. A student who willfully destroys or damage or defaces University property shall be called upon to make good the loss to the University and will also be liable to other penalties, such as fines and forfeiture of caution money.

14. Any student found (by any of the Teachers, Provosts, Director Students' Welfare or Vice-Chancellor) guilty of misconduct towards any person within the University campus shall be subject to appropriate disciplinary action ranging from fine to expulsion for good from the University as may be decided by the appropriate authority of the University mentioned in the above sections.

15. Any student found by the Students' Discipline Committee guilty of moral turpitude shall ordinarily be expelled from the University for good. The Academic Council on appeal from the delinquent student may show mercy to deserving cases by imposing less severe punishment.

16. The University authority shall have the right to take disciplinary action against any student for any act considered as unethical and/or social crime in the eyes of law of the country.

B. ORDINANCE REGARDING DISCIPLINE AT EXAMINATION HALLS

17. (i) The Chief Invigilator shall be responsible for maintenance of discipline in the examination halls.

(ii) An invigilator on duty in the examination hall shall report to the Chief Invigilator in case of breach of discipline in the examination hall. The Chief Invigilator may expel the examinee concerned from the hall debarring him from appearing at that particular examination.

(iii) Breach of discipline in the examination halls shall be reported by the invigilator to the Vice-Chancellor through the Chief Invigilator.

18. The candidates shall strictly follow the following instructions:

(i) Candidates are strictly forbidden to keep mobile phone and any other display device with their possession.

(ii) Candidates are strictly forbidden to write their names on the cover or any part of the answer script. If a candidate does so, his answer script will not be assessed.

(iii) Each candidate must write legibly his Examination Roll Number and Registration number on the first cover of scripts. If any candidate omits to write his Examination Roll Number and Registration Number on the cover of his answer script, the paper may not be assessed.

(iv) When more than one answer script is used, each additional script should be stitched to the first script immediately after it is supplied, and the Examination Roll Number and Registration Number should also be written

by the candidate on the cover of the additional script or scripts immediately.

(v) No loose paper will be provided for scribbling and no paper is to be brought in for this purpose. Any candidate found with loose paper in his possession will be expelled from the examination hall. All works must be done in the scripts provided and pages must not be torn out. The scripts provided must be submitted, it cannot be replaced by another, if necessary, additional scripts will be given. All works intended for assessment by the examiner should be written on both sides of the paper.

(vi) Candidates are forbidden to write anything whatsoever on the question paper.

(vii) In any matter not specifically mentioned in these rules, candidates are required to abide by the decision of the invigilator in the examination hall/room.

(viii) No candidate will be allowed to leave the examination hall/room until one hour has elapsed from the time when the question papers are given out.

19. Disciplinary action will be taken against candidates reported to have violated the instructions under Section 18 or resorted to unfair means and/or acts of indiscipline at the different examinations as follows:

a. The term "whole examinations" in this article means all examinations of the theory courses (70%) registered by the candidate to appear at the respective Term Final examination but excluding Sessionals, Class Tests and Attendance, conducted during that academic term.

b. The term "writings in possession" in this article means writings in the possession of the examinee or in his apparels, in papers, calculator, any display device, drawing instruments and scales etc. found with him or off or near the desk, bench or chair etc.

(i) (a) Attempts to communicate with examinee or examinees in the examination hall: first time- warning which may be accompanied by a change of seats; second time- deduction of 5% of the total marks of paper; third time-expulsion from the examination hall for that paper and reduction of a total of 10% of total marks on that paper.

(b) Attempts to communicate/discuss with other examinee or examinees outside the examination hall during the period of examination: expulsion from the examination hall for that paper.

(ii) (a) Possession of writings related to the particular subject of examination without attempt to copy: expulsion from examination hall and cancellation of whole examinations.

(b) Possession of writings related to the particular subject of examination and attempts to communicate with other examinee or examinees: expuls

from examination hall and cancellation of whole examinations and expulsion from the University for a period of Half Academic Year (as defined in the Academic Regulations).

(c) Possession of writings related to the particular subject of examination and

attempts to copy or receive information from any other source (s): expulsion from examination hall and cancellation of whole examinations and also expulsion from the University for One Academic Year (as defined in the Academic Regulations).

(d) Possession of writings related to the particular subject of examination or copying/receiving information from any other source (s): expulsion from examination hall and cancellation of whole examinations and also expulsion from the University for One and Half Academic Years (as defined in the Academic Regulations).

(iii) Use of violent language and holding out threats to examiners and/or invigilators: expulsion from the whole examination and/or expulsion from the University for good.

(iv) Attempts to get possession of the question paper or examination scripts before the examination: expulsion from the whole examinations and expulsion from the University for one to two academic years (as defined in the Academic Regulations).

(v) Writings on loose papers not related to the examination (viz. blotting paper, question paper etc.): seizure of the writings and cancellation of the answer script and expulsion from the examination hall.

(vi) Attempts to influence the examiner: cancellation of the paper.

(vii) Impersonating or causing to impersonate in the examination hall/rooms: expulsion from the University for good.

(viii) Insertion in the examination scripts, answer to any question or questions written outside the examination and expulsion for one to Two Academic Years (as defined in the Academic Regulations).

(ix) Having a question answered by someone else: cancellation of the whole examination and expulsion from the University for Two Academic Years (as defined in the Academic Regulations).

20. The invigilator is empowered to warn a student and deduct his mark up to 5% as mentioned in Section 19(i) above. The Chief invigilator is empowered to expel students from the examination room/hall if he is satisfied after an enquiry on the spot that the student is guilty of misconduct mentioned in Section 19 above. In all such cases the matter has to be reported to the Vice-Chancellor with incriminating documents, of any. Decisions for cancellation of the examination and expulsion from the University for a period of not exceeding six months will be taken by Vice-Chancellor. For expulsion for a period more than six months, the Vice-Chancellor shall refer the matter to the Students' Discipline Committee provided in Section 1.

21. Class tests including quiz, field test, viva-voce & such other similar examination shall be considered as part of the final examination. The following disciplinary action (s) will be taken against the students violating discipline rules in the above-mentioned tests/examinations.

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Column-1		Column-2	
Offence		Action	
i)	Attempts to communicate with other student(s).	i)	Cancellation of that class test by the concerned teacher.
ii)	Copying or trying to copy from the answer script of other student(s).	ii)	Cancellation of the class test of both the students, who copied and who helped in copying, by the concerned teacher.
iii)	Possessions of writings related to the subject of the class test, writing on loose papers, calculator, desk, chair, any part of the body, apparels, calculator, scale, drawing instruments etc. found with the student or, off or near his/her seat will be considered as writings in possession.	iii)	Cancellation of all the class tests of that particular course by the Head of the Department by notification.
iv)	Use of violent language, holding threats, creating obstruction in conducting class test or for similar offence.	iv)	Expulsion from the University for at least one Term by the Students' Discipline Committee depending on the severity of the case.
v)	Impersonating or causing to impersonate in class test.	v)	Expulsion for one academic year by the Students' Discipline Committee.

22. If a student wants to file an appeal against the actions as described in section 21 above, he/she can do so within 15 days after the imposition of punishment to the Head of the Department in case of (i) & (ii), to the Students' Discipline Committee in case of (iii) and to the Academic Council in case of (iv) & (v).

মাদকদ্রব্য প্রতিরোধ নীতিমালা, চুয়েট-২০১৬
চট্টগ্রাম প্রকৌশল ও প্রযুক্তি বিশ্ববিদ্যালয় (চুয়েট) -এ মাদকদ্রব্য প্রতিরোধ-এ প্রনীত নীতিমালা

আজকের ছাত্র-ছাত্রীরা ভবিষ্যতের দেশ গড়ার কারিগর। প্রত্যেক ছাত্র-ছাত্রীকে একজন দক্ষ প্রকৌশলীর পাশাপাশি প্রকৃত মানুষ হয়ে সুনাগরিক হিসাবে গড়ে তোলার জন্য মাদকের গ্রহন, বহন, সেবন হতে বিরত রাখার উদ্দেশ্যে একটি নীতিমালা করা সমীচীন ও প্রয়োজনীয়। এ লক্ষ্যে নিম্নরুপ নীতিমালা প্রনয়ন করা হলঃ-

১। (ক) এই নীতিমালা **"মাদকদ্রব্য প্রতিরোধ নীতিমালা, চুয়েট-২০১৬"** নামে অভিহিত হবে।

(খ) এই নীতিমালা সিন্ডিকেট সভার অনুমোদনের তারিখ হতে কার্যকর হবে।

২। বিষয় বা প্রসঙ্গের পরিপন্থী কোন কিছু না থাকলে, এই নীতিমালায় -

(ক) "বিশ্ববিদ্যালয়" অর্থ চট্টগ্রাম প্রকৌশল ও প্রযুক্তি বিশ্ববিদ্যালয়

(খ) "কমিটি" অর্থ এই আইনের অধীনে প্রতিষ্ঠিত "মাদক প্রতিরোধ" কমিটি

(গ) "মাদকদ্রব্য" অর্থ এই নীতিমালায় উল্লেখিত দ্রব্য এবং সরকারী গেজেটে প্রজ্ঞাপন দ্বারা মাদকদ্রব্য বলে ঘোষিত অন্য কোন দ্রব্য

(ঘ) "এ্যালকোহল" অর্থ স্পিরিট এবং যে কোন ধরনের মদ, ওয়াইন, বিয়ার বা ০.৫% অর অধিক এ্যালকোহলযুক্ত যেকোন তরল পদার্থ এর অন্তর্ভূক্ত হবে

(ঙ) "ওয়াইন" অর্থ শর্করা কিংবা শ্বেতসার সম্বলিত যে কোন বস্তুকে পানি ও অন্যান্য উপকরন সহযোগে গাঁজানের মাধ্যমে উৎপন্ন এ্যালকোহলযুক্ত যেকোন তরল পদার্থ

(চ) "বিয়ার" অর্থ মল্ট, হপস সহযোগে কিংবা মল্ট বা হপস সহযোগে ব্রিউয়িং পদ্ধতিতে ব্রিউয়ারীতে প্রস্তুতকৃত অন্যুন ০.৫% এ্যালকোহলযুক্ত যে কোন পানীয়

(ছ) "চিকিৎসক" অর্থ Medical and Dental Council Act,1980-এ সঙ্গায়িত Registered Medical Practitioner ও Dentists.

(জ) " বাহন" অর্থ বাই-সাইকেল, রিক্সা, ভ্যান, মোটর সাইকেল, সিএনজি, স্কুটার, কার মাইক্রোবাস, ট্রাক, বাসসহ যে কোন ধরনের যানবাহন

(ঝ) "মাদকাসক্ত" অর্থ শারীরিক বা মানসিকভাবে মাদকদ্রব্যের উপর নির্ভরশীল ব্যক্তি বা অভ্যাসবশে মাদকদ্রব্য ব্যবহারকারী

(ঞ) "স্থান" বলতে বিশ্ববিদ্যালয়ের আবাসিক হল, একাডেমিক ভবন, প্রশাসনিক ভবন, আবাসিক ভবন, দোকান, যানবাহন, কেন্টিন সহ বিশ্ববিদ্যালয়ের যে কোন স্থান বুঝাবে ।

৩। আপাতত বলবৎ অন্য কোন নীতিমালায় যা কিছুই থাকুকনা কেন, এই নীতিমালায় প্রণীত নীতিসমূহ চট্টগ্রাম প্রকৌশল ও প্রযুক্তি বিশ্ববিদ্যালয় এ কার্যকর থাকবে।

৪। (১) এই নীতিমালার উদ্দেশ্য পূরনকল্পে **"মাদক প্রতিরোধ কমিটি"** নামে একটি কমিটি থাকবে।

(২) কমিটি নিম্নবর্নিত সদস্য সমন্বয়ে গঠিত হবে :

(ক) ছাত্রকল্যাণ পরিচালক যিনি কমিটির সভাপতি হবেন

(খ) উপাচার্য কর্তৃক মনোনীত ২(দুই) জন প্রভোষ্ট (মনোনীত সদস্যগণের মেয়াদকাল ২(দুই) বৎসর)।

(গ) চীফ মেডিক্যাল অফিসার

(ঘ) ডেপুটি রেজিস্ট্রার, আইন/এস্টেট, একাডেমিক এবং নিরাপত্তা

(ঙ) নিরাপত্তা কর্মকর্তা

(চ) ডেপুটি ছাত্রকল্যান পরিচালক, যিনি কমিটির সচিবও হবেন।

(৩) কমিটি-এর মোট সদস্যের অর্ধাংশের উপস্থিতিতে সভার কোরাম পূর্ন হবে।

(৪) সভাপতির অনুপস্থিতে সভাপতি কর্তৃক মনোনীত কমিটির অন্য কোন সদস্য সভায় সভাপতিত্ব করবেন।

৫। কমিটির দায়িত্ব ও কর্তব্য

(ক) মাদকদ্রব্য সৃষ্ট সম্ভাব্য ক্ষতিকর প্রতিক্রিয়া রোধকল্পে প্রয়োজনীয় ব্যবস্থা গ্রহন এবং উহা বাস্তবায়নের জন্য পদক্ষেপ গ্রহন।

(খ) মাদকদ্রব্য সংক্রান্ত যাবতীয় তথ্য সংগ্রহের জন্য যে কোন ধরনের কার্যক্রম পরিচালনা।

(গ) মাদকদ্রব্য সরবরাহ ও ব্যবহার রোধে প্রয়োজনীয় ব্যবস্থা গ্রহন।

(ঘ) মাদকাসক্তের চিকিৎসা ও পুনর্বাসন সংক্রান্ত বিষয়ে সংশ্লিষ্ট অভিভাবকের সাথে যোগাযোগ পূর্বক প্রয়োজনীয় ব্যবস্থা গ্রহন।

(ঙ) মাদকাসক্তির কুফল সম্পর্কে ছাত্র/ছাত্রীদেরকে সচেতন করার জন্য প্রয়োজনীয় শিক্ষা ও প্রচারনামূলক কার্যক্রম পরিচালন।

(চ) মাদকদ্রব্য সংক্রান্ত বিষয়ে মাদকদ্রব্য নিয়ন্ত্রন অধিদপ্তর ও সংশ্লিষ্ট সংস্থার সাথে যোগাযোগ স্থাপন এবং এতদসংক্রান্ত যাবতীয় কার্যক্রমের সমন্বয় সাধন।

(ছ) উপরি-উক্ত দায়িত্ব পালন ও কর্তব্য সম্পাদনের জন্য প্রয়োজনীয় যে কোন ব্যবস্থা গ্রহণ।

৬। বিশ্ববিদ্যালয়ের সাথে সংশ্লিষ্ট যে কেউ বিশ্ববিদ্যালয়ের কোন ছাত্র/ছাত্রী মাদকাসক্ত বলে সন্দেহ করেন, তাহলে তিনি তৎসম্পর্কে কমিটিকে অবহিত করবেন। এতদ্‌সংক্রান্ত তথ্য প্রদানকারীর পরিচয় গোপন রাখা হবে।

৭। বিশ্ববিদ্যালয় ক্যাম্পাসের-এর বাহিরের আশেপাশের কোন দোকান/হোটেল/বাড়িতে মাদকদ্রব্য ক্রয়/বিক্রয় সংক্রান্ত কোন তথ্য কমিটির নিকট থাকলে এ বিষয়ে প্রয়োজনীয় ব্যবস্থা গ্রহণের জন্য বিশ্ববিদ্যালয় প্রশাসন আইন শৃঙ্খলা রক্ষাকারী বাহিনীকে অবহিত করবেন।

৮। যদি কমিটির কোন সদস্য জানতে পারেন যে, কোন ছাত্র/ছাত্রী মাদকাসক্ত হওয়ার কারনে প্রায়শঃ অপ্রকৃতিস্থ থাকেন এবং তাকে স্বাভাবিক জীবনে ফিরিয়ে আনার জন্য অনতিবিলম্বে তার চিকিৎসা করা প্রয়োজন, তা হলে কমিটির সভাপতি সংশ্লিষ্ট ছাত্র/ছাত্রীর অভিভাবকের সাথে যোগাযোগ করে পত্র মারফত উক্ত ছাত্র/ছাত্রীর চিকিৎসার্থে কোন উপযুক্ত চিকিৎসকের নিকট বা মাদকাসক্তি নিরাময় কেন্দ্রে প্রেরনের নির্দেশ প্রদান করবেন।

৯। মাদক নিয়ন্ত্রণ আইন ১৯৯০ এর ১৬(৮) ধারা মোতাবেক সরকার-এর নিকট হতে মাদকাসক্ত কোন ছাত্র/ছাত্রীর বাধ্যতামূলক চিকিৎসার ব্যয়ভার গ্রহনের জন্য কমিটির সুপারিশক্রমে সংশ্লিষ্ট ছাত্র/ছাত্রীর অভিভাবক প্রয়োজনীয় পদক্ষেপ গ্রহন করবেন।

১০। বিশ্ববিদ্যালয়ের কোন চিকিৎসক যদি এরূপ মনে করেন যে, তার চিকিৎসাধীন কোন ছাত্র/ছাত্রী মাদকাসক্ত এবং সেজন্য যথাযথ চিকিৎসা প্রয়োজন, তাহলে তিনি এই চিকিৎসার প্রয়োজনীয়তার কথা লিখিতভাবে কমিটিকে অবহিত করবেন।

১১। (ক) এই নীতিমালায় সুপারিশকৃত শাস্তি বিশ্ববিদ্যালয়ের Students Discipline Committee এর মাধমে প্রদান করা হবে।

(খ) কোন ছাত্র/ছাত্রী নিম্নের টেবিলে উল্লেখিত কোন মাদকদ্রব্য সেবন/ব্যবসায়িক/অন্য কোন উদ্দেশ্যে নিজ অধিকারে রাখলে নিম্নের ছকে উল্লেখিত পরিমান শাস্তি প্রাপ্ত হবে ঃ

ক্রমিন নং	মাদকদ্রব্যের নাম	শাস্তির পরিমান
(i)	ইয়াবা ট্যাবলেট	(ক) ইয়াবা ট্যাবলেটের পরিমান অনুর্ধ্ব ১০টি হলে ২ বৎসর একাডেমিক বহিষ্কার (খ) ইয়াবা ট্যাবলেটের পরিমান ১০টির বেশী হলে ৩ বৎসর একাডেমিক বহিষ্কার (গ) বিশ্ববিদ্যালয় আবাসিক হল হতে আজীবন বহিষ্কার
(ii)	ফেনসিডিল	(ক) ফেনসিডিলের পরিমান অনুর্ধ্ব ৫ বোতল হলে ২ বৎসর একাডেমিক বহিষ্কার (খ) ফেনসিডিলের পরিমান ৫ বোতলের বেশী হলে ৩ বৎসর একাডেমিক বহিষ্কার (গ) বিশ্ববিদ্যালয় আবাসিক হল হতে আজীবন বহিষ্কার
(iii)	এ্যালকোহল, ওয়াইন, বিয়ার	(ক) মাদকদ্রব্যের পরিমান অনুর্ধ্ব ৫ বোতল/ক্যান হলে ২ বৎসর একাডেমিক বহিষ্কার (খ) মাদকদ্রব্যের পরিমান ৫ বোতল/ক্যানের বেশী হলে ৩ বৎসর একাডেমিক বহিষ্কার (গ) বিশ্ববিদ্যালয় আবাসিক হল হতে আজীবন বহিষ্কার
(iv)	হেরোইন, কোকেন এবং কোকা উদ্ভুত মাদকদ্রব্য	(ক) মাদকদ্রব্যের পরিমান অনুর্ধ্ব ২৫ গ্রাম হলে ২ বৎসর একাডেমিক বহিষ্কার (খ) মাদকদ্রব্যের পরিমান ২৫ গ্রামের বেশী হলে ৩ বৎসর একাডেমিক বহিষ্কার (গ) বিশ্ববিদ্যালয় আবাসিক হল হতে আজীবন বহিষ্কার
(v)	পেথিডিন, মরফিন ও টেট্রাহাইড্রোক্যানাবিনল	(ক) মাদকদ্রব্যের পরিমান অনুর্ধ্ব ১০ গ্রাম হলে ২ বৎসর একাডেমিক বহিষ্কার (খ) মাদকদ্রব্যের পরিমান ১০ গ্রামের বেশী হলে ৩ বৎসর একাডেমিক বহিষ্কার (গ) বিশ্ববিদ্যালয় আবাসিক হল হতে আজীবন বহিষ্কার
(vi)	অপিয়াম, ক্যানাবিস, রেসিন	(ক) মাদকদ্রব্যের পরিমান অনুর্ধ্ব ২ কেজি হলে ২ বৎসর একাডেমিক বহিষ্কার (খ) মাদকদ্রব্যের পরিমান ২ কেজির বেশী হলে ৩ বৎসর একাডেমিক বহিষ্কার (গ) বিশ্ববিদ্যালয় আবাসিক হল হতে আজীবন বহিষ্কার
(vii)	মেথাডন	(ক) মাদকদ্রব্যের পরিমান অনুর্ধ্ব ৫০ গ্রাম হলে ২ বৎসর একাডেমিক বহিষ্কার (খ) মাদকদ্রব্যের পরিমান ৫০ গ্রামের বেশী হলে ৩ বৎসর একাডেমিক বহিষ্কার (গ) বিশ্ববিদ্যালয় আবাসিক হল হতে আজীবন বহিষ্কার
(viii)	গাঁজা বা যে কোন ভেষজ ক্যানাবিস	(ক) মাদকদ্রব্যের পরিমান অনুর্ধ্ব ২৫০ গ্রাম হলে ২ বৎসর একাডেমিক বহিষ্কার (খ) মাদকদ্রব্যের পরিমান ২৫০ গ্রামের বেশী ৩ বৎসর একাডেমিক বহিষ্কার (গ) বিশ্ববিদ্যালয় আবাসিক হল হতে আজীবন বহিষ্কার
(ix)	যে কোন প্রজাতির ক্যানাবিস গাছ	(ক) ক্যানাবিস গাছের সংখ্য অনুর্ধ্ব ২৫টি হলে ২ বৎসর একাডেমিক বহিষ্কার (খ) ক্যানাবিস গাছের সংখ্যা ২৫টির বেশী হলে ৩ বৎসর একাডেমিক বহিষ্কার (গ) বিশ্ববিদ্যালয় আবাসিক হল হতে আজীবন বহিষ্কার
(x)	ফেনসাইক্লিআইন, মেথাকোয়ালন, এল.এস.ডি, বারবিরেটস, এমফিটামিন	(ক) মাদকদ্রব্যের পরিমান অনুর্ধ্ব ৫ গ্রাম হলে ২ বৎসর একাডেমিক বহিষ্কার (খ) মাদকদ্রব্যের পরিমান ৫ গ্রামের বেশী হলে ৩ বৎসর একাডেমিক বহিষ্কার (গ) বিশ্ববিদ্যালয় আবাসিক হল হতে আজীবন বহিষ্কার

(গ) কোন ছাত্র/ছাত্রীকে মাদকাসক্ত অবস্থায় সনাক্ত করা গেলে তাকে ১ বৎসরের জন্য একাডেমিক বহিষ্কার এবং আজীবন আবাসিক হল হতে বহিষ্কার শাস্তি প্রদান করা হবে।

(ঘ) কোন ছাত্র/ছাত্রী মাদক সেবনরত অবস্থায় সনাক্ত করা গেলে তাকে ২ বৎসরের জন্য একাডেমিক বহিষ্কার এবং আজীবন আবাসিক হল হতে বহিষ্কার শাস্তি প্রদান করা হবে।

(ঙ) অত্র বিশ্ববিদ্যালয়ের ছাত্র/ছাত্রী ব্যতিরেকে বিশ্ববিদ্যালয়ের ক্যাম্পাসে যে কোন কাউকে যে কোন ধরনের মাদক বহন/সেবনরত অবস্থায় পাওয়া গেলে কমিটির সুপারিশ ক্রমে বিশ্ববিদ্যালয় কর্তৃপক্ষ যথাযথ শাস্তির ব্যবস্থা করবে। সে ক্ষেত্রে প্রয়োজনবোধে আইন শৃঙ্খলা রক্ষাকারী বাহিনীর সহায়তা গ্রহন করা হবে।

(চ) নীতিমালায় উল্লেখিত মাদকদ্রব্য সংক্রান্ত যে কোন অভিযোগের সংশ্লিষ্টতা থাকার প্রমাণ কমিটি কর্তৃক মেডিক্যাল টেস্টের মাধ্যমে নিশ্চিত করা হবে।

(ছ) এই নীতিমালায় উল্লেখিত মাদকদ্রব্য সমূহের ব্যবহার/সংরক্ষণ/অন্য কোন উদ্দেশ্যে কোন ছাত্র/ছাত্রী তার নিজ কক্ষ, যানবাহন, সরঞ্জামাদি ব্যবহার করে বা করতে দেয়, তা হলে উক্ত ছাত্র/ছাত্রীকে ৬ মাসের জন্য একাডেমিক বহিষ্কার এবং আজীবনের জন্য বিশ্ববিদ্যালয়ের আবাসিক হল হতে বহিষ্কার করা হবে।

(জ) হয়রানির উদ্দেশ্যে যদি কোন ছাত্র/ছাত্রী অসত্য বা বিভ্রান্তিমূলক তথ্য প্রদান করেন, তা হলে তাহার বিরুদ্ধে প্রয়োজনীয় শাস্তিমূলক ব্যবস্থা গ্রহন করা হবে।

(ঝ) এই নীতিমালায় উল্লেখিত মাদকদ্রব্য সমূহ গ্রহণে কোন ছাত্র/ছাত্রী কাউকে সাহায্য করলে/প্ররোচনা দিলে/ জোরপূর্বক বাধ্য করলে উক্ত ছাত্র/ছাত্রীকে ৬ মাসের জন্য একাডেমিক বহিষ্কার এবং আজীবনের জন্য বিশ্ববিদ্যালয়ের আবাসিক হল হতে বহিষ্কার করা হবে।

(ঞ) কোন ছাত্র/ছাত্রী যদি মাদকদ্রব্য সংক্রান্ত এমন কোন অপরাধের সাথে জড়িত হয়ে পড়ে যার জন্য এই নীতিমালায় স্বতন্ত্র কোন দন্ডের ব্যবস্থা নেই, তা হলে উক্ত ছাত্র/ছাত্রীকে এই অপরাধের জন্য কমিটি কর্তৃক সুপারিশকৃত শাস্তি প্রদান করা হবে।

(ট) কোন ছাত্র/ছাত্রীকে মাদক সেবনরত/মাদকদ্রব্য নিজ অধিকারে রাখা অবস্থায় সনাক্ত করা গেলে তাৎক্ষনিকভাবে সংশ্লিষ্ট আবাসিক হলের প্রভোস্ট কর্তৃক বিশ্ববিদ্যালয়ের আবাসিক হল হতে সাময়িকভাবে বহিষ্কার করা হবে।

(ঠ) এই নীতিমালার অধীনে প্রথমবার শাস্তিপ্রাপ্ত ছাত্র/ছাত্রী দ্বিতীয়বার শাস্তির আওতায় আসলে তাকে বিশ্ববিদ্যালয় হতে আজীবন একাডেমিক বহিষ্কারাদেশ প্রদান করা হবে।

১২। এই নীতিমালায় উল্লেখিত যে কোন মাদকদ্রব্য আটকের সঙ্গে সঙ্গে মাদকদ্রব্যগুলি কমিটির সভাপতির এখতিয়ারে রাখা হবে। কমিটির সভাপতি প্রয়োজন অনুযায়ী দ্রব্যটি হস্তান্তর/সংরক্ষন/ধ্বংসের প্রয়োজনীয় ব্যবস্থা গ্রহন করবেন।

১৩। কমিটির সদস্যবৃন্দ বিশ্ববিদ্যালয়ের যে কোন স্থানে (আবাসিক এলাকায় প্রবেশের ক্ষেত্রে উপাচার্য মহোদয়ের অনুমতি সাপেক্ষে) যে কোন সময়ে তল্লাশীর জন্য প্রবেশ করতে পারবেন। এক্ষেত্রে ঃ

(ক) উক্ত স্থানে প্রবেশ কালে বাধাগ্রস্থ হলে বাধা অপসারনের জন্য দরজা জানালা ভাঙ্গাসহ যেকোন প্রয়োজনীয় ব্যবস্থা গ্রহন করতে পারবেন।

(খ) উক্ত স্থানে তল্লাশীকালে প্রাপ্ত মাদকদ্রব্য এবং এই নীতিমালার অধীনে অপরাধ প্রমাণে সহায়ক কোন দস্তাবেজ বা জিনিসপত্র আটক করতে পারবেন।

(গ) উক্ত স্থানে উপস্থিত যে কোন ব্যক্তির দেহ তল্লাশী করতে পারবেন।

(ঘ) তল্লাশী পরিচালনা কালে কমিটির কোন সদস্যের যদি মনে হয়, কোন ব্যক্তি তার শরীরের কোন অংগ প্রতঙ্গে মাদকদ্রব্য লুকিয়ে রেখেছে, তা হলে উক্ত ব্যক্তির শরীরের এক্স-রে করা বা মূত্রসহ অন্য যে কোন প্রকার প্রয়োজনীয় পরীক্ষার নির্দেশ দিতে পারবেন।

১৪। অভিযুক্ত ছাত্র/ছাত্রী অপরাধ সংঘটনের সময়ে হাতে নাতে ধৃত হলে, তাহার ধৃত হবার তারিখ হতে পরবর্তী পনের কার্যদিবসের মধ্যে নির্ধারিত শাস্তির কার্যাদি সম্পন্ন করা হবে। অভিযুক্ত ব্যক্তি অপরাধ সংঘটনের সময় হাতে নাতে ধৃত না হলে, অপরাধ সংঘটন সংক্রান্ত প্রাথমিক তথ্য প্রাপ্তির তারিখ হতে পরবর্তী ত্রিশ কার্যদিবসের মধ্যে নির্ধারিত শাস্তির কার্যাদি সম্পন্ন করা হবে।

১৫। এই নীতিমালার অধীনে পরিচালিত কোন কার্যক্রমের কোন পর্যায়ে কোন বস্তুর রাসায়নিক পরীক্ষার প্রয়োজন দেখা দিলে তা, বিশ্ববিদ্যালয়ে স্থাপিত রাসায়নিক পরীক্ষাগারে অথবা কমিটি কর্তৃক নির্ধারিত যে কোন পরীক্ষাগারে সম্পাদন করা হবে।

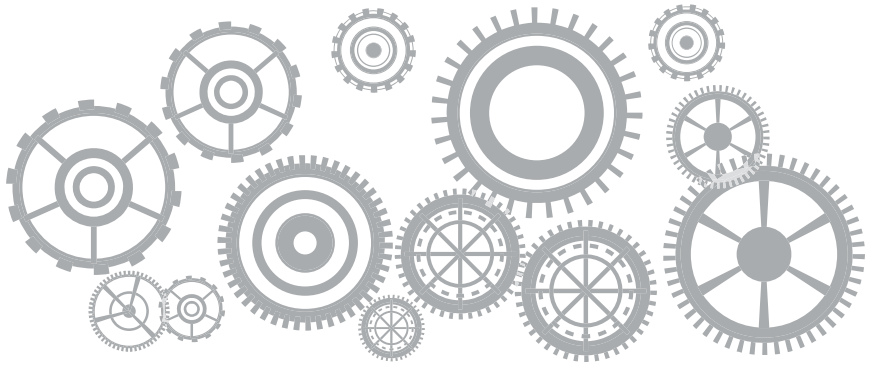
১৬। রাসায়নিক পরীক্ষকের স্বাক্ষরযুক্ত রাসায়নিক পরীক্ষার রিপোর্ট এই নীতিমালার অধীনে কোন তদন্ত, বিচার বা অন্য কোন প্রকার কার্যক্রমের সাক্ষ্য হিসাবে ব্যবহার করা যাবে।

১৭। ছাত্র/ছাত্রীদেরকে মাদকাসক্তি থেকে মুক্ত রাখার জন্য মাঝে মাঝে ছাত্র/ছাত্রীদের দৈবচয়ন পদ্ধতিতে রক্ত পরীক্ষাকরন কর্মসূচী পরিচালনা করা হবে।

Undergraduate Bulletin

CURRICULUM & DETAILED SYLLABUS

FROM SESSION 2018-2019 (2018 BATCH & ONWARDS)



Department of

MECHANICAL ENGINEERING

Chittagong University of Engineering & Technology

SUMMARY OF CREDIT HOURS/SEMESTER

LEVEL	TERM	CLASSES (Hours per week)	CREDITS
1	I	25.0	20.50
	II	25.0	20.50
2	I	25.0	20.50
	II	25.0	20.50
3	I	25.5	20.25
	II	21.0	18.00
4	I	21.5**	20.75
	II	25.0	20.50

TOTAL = 161.50

** EXCLUDES 3 WEEKS OF INDUSTRIAL TRAINING

DISTRIBUTION OF CREDITS AMONG MAJOR FIELDS

	TOTAL CREDITS	RELATIVE PERCENTAGE (%)
PHYSICS	7.50	4.64
CHEMISTRY	7.50	4.64
MATHEMATICS	14.00	8.67
HUMANITIES	11.75	7.28
MECHANICAL ENGINEERING##	110.50	68.42
RELATED ENGINEERING	10.25	6.35
TOTAL	161.50	100

MECHANICAL ENGINEERING CURRICULUM AND COURSE CONTENT

B. Sc. ENGINEERING LEVEL–1 (TERM-I)

Sl. No.	Course No.	Course Title	Contact hour/week	Credits
THEORY				
1	Phy131	Physics – I	3	3
2	Chem131	Chemistry	3	3
3	Math131	Calculus and Geometry	4	4
4	Hum131	Sociology and Industrial Psychology	3	3
5	ME111	Thermal Engineering	3	3
SESSIONAL/LABORATORY				
6	Chem132	Chemistry	3	1.5
7	ME112	Thermal Engineering	3/2	0.75
8	ME152	Welding and Foundry	3/2	0.75
9	ME172	Mechanical Drawing and Auto CAD	3	1.5
			25	20.5

Contact Hours: 16 (Theo.) + 9 (Lab.) = 25 hours/week
No. of Theory Courses = 05
Total Credits = 20.5
No. of Laboratory Courses = 04

COURSE CONTENT

PHYSICS-I(PHY 131) 3 credit, 3 periods/week	**No. of Lectures**
Theory	
Pyrometry: Platinum Resistance Thermometer, optical and radiation pyrometers, Calorimety: Newton's law of cooling, radiation connection in calorimetric input.	5
X-ray: Production, properties and applications of X-rays.	2
Properties of matter: **Surface Tension**: Surface tension as a molecular phenomenon, surface tension and surface energy, excess pressure, capillarity, Quinck's method.	4
Solar Energy: Solar radiation and the Sun, Solar spectrum,	3

DISTRIBUTION OF CREDITS AMONG MAJOR FIELDS

MECHANICAL ENGINEERING CURRICULUM AND COURSE CONTENT

MECHANICAL ENGINEERING COURSES INCLUDE COURSES ON DRAWING, COMPUTER PROGRAMMING, NUMERICAL ANALYSIS, AND INDUSTRIAL AND PRODUCTION ENGINEERING IN ADDITION TO CORE AND OPTIONAL COURSES.

Solar constant, Solar Photovoltaics, Solar radiation measuring instruments.	
Geometrical Optics: Reflection and refraction by spherical surfaces, lenses, Astigmatic lenses, Combination of thin lenses, Defects of images formed by spherical mirrors and lenses, spherical aberration, Astigmatism, distortion, curvature of image, Longitudinal and transverse chromatic aberration achromatic combination of lenses, Detailed study of eyepieces and objectives.	12
Waves and Oscillations: Differential equation of a simple harmonic motion, Total energy and average energy, Combination of simple harmonic oscillations, Lissajous' figures.	4
Spring-mass system, Calculation of time period of torsional pendulum; damped oscillation, determination of damping co-efficient, forced oscillation, resonance, two-body oscillations.	4
Reduced mass: differential equation of a progressive wave, power and intensity of wave motion, stationary wave, group velocity and phase velocity.	2
Architectural acoustics: Reverberation and Sabine's formula.	2

CHEMISTRY (CHEM 131)

3 credit, 3 Periods/week

	No. of Lectures
Theory	
Nuclear Chemistry: Radioactivity, types and properties of radiations, nuclear reactions, energy released in radiation, mass defect, nuclear binding energy, nuclear stability.	3
Bonding: Different types of Bonds, Valence bond theory, Hybridization, Resonance, Molecular orbital theory, Linear combination of atomic orbital, Metallic bond, Hydrogen bond, Dipole bond, venderwall's metals.	5
Classification of elements: Periodic properties of elements, variation of properties of elements with their periods and groups, properties of s, p, d and f types elements, characteristics and uses of transition metals.	5

Chemistry of semiconductor materials: Physical and chemical properties of boron, Silicon, Gallium, Arsenic and Antimony, preparation of pure silicon, properties of semiconductor, Intrinsic semiconductor, Extrinsic semiconductor, p-n junction and application of semiconductors.	5
Hydrocarbons: Alkanes, alkenes, alkynes, dyenes, their preparation, properties and uses.	4
Colloidal solution: Classification of colloids, general methods of preparation and purification, properties of colloids i. e., color, optical, kinetic, electrical, coagulation, Gold number, origin of charge, emulsions, gels, application of colloids in engineering problems.	5
Separation Techniques: Distillation: Principle of distillation; fractional distillation and steam distillation, Evaporation; Principle of single and multiple effect evaporators and their operations, Solvent extraction; principle and application of solvent extraction process, chromatography; column chromatography, thin layer chromatography, gas chromatography and instrumentation.	6
Spectrophotometry: The electromagnetic radiation, Interaction of radiant energy with molecules, electronic transition of UV Vis spectroscopy, Beer-lambert's law, Instrumentation of spectroscopy, double beam instruments, plotting of spectrosphotometric data, application of spectroscopy.	5

CHEMISTRY (CHEM 132)

1.5 credit, 3 Periods/week

Sessional

Name of the Experiments:

1. Preparation of standard Sodium Oxalate solution and standardization of Potassium Permanganate solution.
2. Determination of Ferrous ion with standard Potassium Permanganate solution.
3. Preparation of Standard Potassium Dichromate solution and Standardization of sodium Thiosulphate solution.
4. Determination of Cupper by Iodometrically with standard Sodium Thiosulphate solution.
5. Determination of Calcium in Calcium Carbonate.

6. Estimation of Zinc and Cupper form Analysis of Brass.
7. Etc.

CALCULUS AND GEOMETRY (MATH 131)

4 credit, 4 periods/week

No. of Lectures

Differential Calculus:
Limit, Continuity and differentiability of functions, Indeterminate forms, L'Hospital's Rule, Derivatives and differentials, Successive differentiation, Leibnitz's theorem. — 19
General Theorems: **General Theorems**: Rolle's theorem, Mean Value theorem, Taylor's theorem.
Partial differentiation: Total derivative and total differential, Geometric meaning of partial derivative and differential, Homogeneous function, Euler's theorem for homogeneous function. Application.
Tangent and normal: Tangent and normal in Cartesian and polar co-ordinates, subnormal and subtangent in polar and Cartesian co-ordinates, Catenary, Pedal equation.
Maxima and minima: Evaluation of maximum and minimum values of functions having more than one variable. Lagrange multiplier method.

Integral Calculus: — 19
Indefinite Integral: Integration of various types of functions, special form of Integration, Integration by Reduction.
Definite Integral: Definite integral of various types of functions, Definite integral as the limit of a sum, fundamental properties of definite integral, Walli's formula, More reduction formula, Gamma and Beta functions, Area under the plane curves in Cartesian and polar form, arc length of the curve in polar and Cartesian co-ordinates, Volume and Surface area of a solid of revolution.

Co-ordinate Geometry:
Two-dimension Geometry: Transformation of co-ordinates, pair of straight lines, General equation of 2nd degree (Reduced to standard form of the curve, Properties, equation of tangent, normal chord of contact, chord in terms of middle point). — 7
Three-dimension Geometry: Rectangular Co-ordinates: Co-ordinate system, Direction cosines, Direction ratios, Angle between two lines, Projection, Plane, Angle between two planes, condition of perpendicularity and parallelism of two planes. Equation of straight line (Standard form and symmetric form), condition for perpendicularity and parallelism, shortest distance between two straight lines. — 7

SOCIOLOGY AND INDUSTRIAL PSYCHOLOGY (HUM 131)

3 credit, 3 periods/week

No. of Lectures

Sociology: Definition, methods, scope and its importance from engineering point of view. — 2

Basic concepts: Family, society, group, mob, association, community, institutions, state, government, social structure, social control and social change. — 10

Culture and Civilization: Social history and culture of Bangladesh-India-Pakistan sub-continent and its antiquity, tribal in Bangladesh, familiarity with ancient civilizations of the world. — 5

Social Changes and Problems: Urbanization and Industrialization in Bangladesh and their effects. Urban ecology, Social Problems- population, property, beggary, immoral income, crime, juvenile delinquency, unemployment, rights and duties of man living in society. — 7

Psychology: Psychology of the individual, psychology of the group, group formation and solidarity of the group, psychology of the attitude: beliefs, prejudice, interest and ideologies; Personality: types, factors, theories of personality, self assessment, abnormal personality, psychological tests, work stress and mental health. — 14

THERMAL ENGINEERING (ME 111)

3 credit, 3 periods/week

No. of Lectures

Theory
Introduction to Thermodynamics: — 5
Introduction to SI system of units; Definition of thermodynamics; macroscopic and microscopic thermodynamics; thermodynamic system and control volume; classes of systems; thermodynamic properties, processes and cycles; intensive and extensive properties; reversible and irreversible processes; flow and non-flow processes; constant volume, constant pressure, isothermal, adiabatic, polytrophic and isentropic processes; thermodynamic equilibrium; Zeroth law of thermodynamics; kinetic energy and potential energy.

First Law of Thermodynamics: The first law of thermodynamics; non-flow energy equation; internal energy; enthalpy; law of conservation of energy; corollaries of First Law, perpetual motion machine of the first kind; specific heats; relation between specific heats; application of the first law to some common closed system processes; the first law as applied to open system; steady flow energy equation; applications of the steady flow energy equation; non steady flow process.	6
Work and Heat: Definitions of work and heat; comparison of work and heat; path and point functions.	2
Energy: Introduction of sources of energy; renewable and nonrenewable sources of energy; merits and demerits of renewable fuel; energy sources and uses in Bangladesh	2
Pure Substance: Definition; phase of a pure substance; phase changes; independent properties of a pure substance; p-T, p-v, T-s and h-s diagrams; triple point and critical point; tables of thermodynamic properties of steam; mollier Diagram, dryness fraction of steam; throttling calorimeter; internal energy, enthalpy, specific volume and entropy of wet and superheated steam; work and heat transfers in non-flow and flow process of steam.	6
Introduction of Steam Power Plant: Brief description of steam power plant and its main components; Introduction of boiler; main parts; details classification; boiler selection criteria; boiler mounting and accessories; brief description of Babcock-Willcox boiler, Locomotive boiler, Stirling boiler, Benson boiler; efficiency and power calculation of boiler.	8
Internal Combustion Engines: Introduction of petrol and diesel engines; types of engine; working principle of both 4-stroke and 2-stroke engines; main parts and functions; p-v & T-s diagrams of cycles; valve timing diagram; brief description of carburetion, injection, ignition, lubrication and cooling systems of IC engine; IHP, BHP and mechanical efficiency calculations; air standard Otto cycle; Diesel cycle efficiency.	10
THERMAL ENGINEERING (ME 112) 0.75 credit, 3/2 periods/week	

Sessional Experiments Based on Theory and study of models of IC Engines.	
WELDING AND FOUNDRY (ME 152) 0.75 credit, 3/2 periods/week	Weeks
Sessional **Foundry**: Shop safety practice, acquaintance with foundry tools and equipment, introduction on foundry: molding, casting, pattern, core, bench, practice on simple bench or floor molding with solid and split pattern in green sand with and without cores, preparation of molding sand and core, preparation of mold, casting, study of defects in casting.	2
Welding: Shop safety practice, acquaintance with arc and gas welding tools, machines, electrodes, gas cylinders, and their identification, types of gas flames, safety and precaution, job preparation for welding. Practice on gas, arc welding and gas cutting of MS sheets and plates, soldering and brazing practice, study of welding defects.	2
Sheet Metal: Shop safety practice, identification of different types of sheets/plates, e.g. CI., GI, MS, GP, BP sheet etc. with commercial specification, acquaintance with sheet metal working tools, machines and measuring instruments, practice jobs on sheet metal (development of cones, bends, ducts etc., sheet metal joints, e.g. seam, lap, riveted joints etc.)	2
MECHANICAL DRAWING AND AUTO CAD (ME 172) 1.5 credit, 3 periods/week	**Weeks**
Sessional **Fundamental Concepts:** Views, projections: first angle, third angle, generation of views of solid bodies in different planes, sectional views, auxiliary views, isometric views, dimensioning, and basic concept of working drawing.	6
AutoCAD: Importance to design and drafting, setting up a drawing: starting AutoCAD, menu, planning for a drawing, basic commands, making a simple 2-D drawing, layers, object snap, poly lines and other features, file handling and display control, editing and dimensioning.	6

MECHANICAL ENGINEERING
B. Sc. ENGINEERING LEVEL–1 (TERM-II)

Sl. No.	Course No.	Course Title	Contact hour/week	Credits
		THEORY		
1	Phy133	Physics – II	3	3
2	Chem133	Chemistry of Corrosion, Environment and Materials	3	3
3	Math133	Differential Equations and Vector Calculus	3	3
4	EE131	Electrical Circuits and Machines	4	4
5	ME181	Computing Basics	3	3
		SESSIONAL/LABORATORY		
6	Phy134	Physics	3	1.5
7	EE132	Electrical Circuits and Machines	3/2	0.75
8	ME182	Computer Programming	3	1.5
9	ME154	Machine and Fitting Shop	3/2	0.75
			25.0	20.5

Contact Hours: 16 (Theo.) + 9 (Lab.) = 25.0 hours/week
No. of Theory Courses = 05
Total Credits =20.5
No. of Laboratory Courses = 04

COURSE CONTENT

PHYSICS-II (PHY 133) 3 credit, 3 periods/week	**No. of Lectures**
Theory **Modern Physics**: Michelson Morley's experiment, Gallelian Transformation, special theory of relativity, Lorentz transformation, length contraction simultaneity and time dilation, mass energy relation.	8
Quantum effect: photoelectric effect, Compton effect, de Broglie wave, Wave particle duality, Interpretation of Bohr's postulates. Radioactive disintegration; Nuclear binding energy, Nuclear reactions; Neutron fusion, Nuclear fission and energy from fuel burn-up, Chain reaction; Neutron energies, Neutron scattering, Neutron diffusion, Nuclear cross-sections, Neutron flux and reaction rates, Moderating power and moderating ratio, Neutron life cycle and four factor formula, Reactor control.	9
Introduction to Solid State Physics: Crystalline and non-crystalline solids, Single crystal and Polycrystalline solids, Unit cell, Crystal systems; Co-ordination number, Sodium chloride and cscl structure, Packing fraction Crystal planes and directions, Miller indices, Calculation of cohesive and bonding energy, distinction between metal, insulator and semiconductor in terms of energy band.	8
Physical Optics: Physical optics of light: Theory of interference; Young's double slit experiment, Interference by multiple reflection: constant and varying thickness films, Fresnel biprism, Interference at wedge shaped films, Newton's rings. Diffraction of light: Fresnel & Fraunhofer diffraction, Fraunhofer diffraction by single slit and double slit, Plane diffraction grating. Polarization: production and analysis of polarized light, Brewster's law, Malus law, Polarization by double refraction, Nicol prism, Polaroid, Optical activity, Polarimeters.	13

PHYSICS-II (PHY 134) 1.5 credit, 3 periods/week **Sessional** Experiments based on PHY 131 and PHY 133.	

CHEMISTRY OF CORROSION, ENVIRONMENT AND MATERIALS (CHEM133) 3 credit, 3 periods/weeks	
Corrosion Chemistry: Corrosion and erosion, nature and its importance, classifications, theories: dry corrosion, wet corrosion, factors affecting dry and wet corrosion, theory of electrochemical corrosion and evidence in its support, passivity of metals, galvanic corrosion, concentration cell corrosion, corrosion, microbiological corrosion, stray current corrosion, grain boundary corrosion, stress corrosion, pitting corrosion prevention and inhibition of corrosion cathodic protection and anodic protection, use of protective coatings like paints, varnishes and metallic coatings.	12
Environmental Chemistry: **Environmental Chemistry**: Environmental segments, atmospheric structure, Chemical species and particulates present in the atmosphere, reactions in atmosphere.	2

Air Pollution: Classification of air pollutant, Characteristics and effects of air pollutants, pollutant from automobiles, pollution control.	3
Water Pollution: Classification of water pollutant, methods and equipments in waste water treatment, waste water from typical industries.	3
Solid Wastes: Classification of solid wastes, characteristics, methods of solid waste treatment and disposal.	2
Hazardous Wastes: Classification of hazardous wastes, identification, management, treatment and disposal of hazardous wastes.	2
Industrial Chemistry: **Glass and Ceramics:** Classification, properties and manufacturing process and properties of glass and ceramics.	2
Cement: Types, properties, manufacturing process and setting of cement.	3
Polymer and Plastics: Classification, bonding, properties of resins, plasticizer, synthesis of bakelite, PVC, polythene, vinyl acetate, cellulose acetate, melamine, etc. and their uses.	3
Natural and Synthetic Rubber: Importance, latex, crude natural rubber, Gutta-percha, compounding and vulcanization of rubber, properties of synthesis of neoprene rubber, nitrile rubber, silicon rubber and Buna-S rubber, reclaimed rubber.	3
Fuels and Lubricants: Classification and properties of solid, liquid and gaseous fuels, distillation and refining of fuels, cracking processes, octane number, cetane number, flash point, aviation gasoline, anti-knocking compounds, CNG, LPG, LNG: production and storing, composition and uses of lubricants.	4

DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS (MATH 133) 3 credit, 3 periods/week	**No. of Lectures**
Ordinary Differential Equation: Definition, formation, order and degree of differential equation (DE), solution of first order 1st degree DE (variable separable, homogeneous, linear, exact), applications to engineering problems.	7
Linear Differential Equation with Constant Co-Efficient: Solution of D.E with constant co-efficients (2nd and higher order). Homogeneous and non homogeneous D.E., Cauchys differential equation, applications to engineering problems.	7
Special Functions: Bessel's equation; Bessel's function and their properties. Legendre's equations; Legendre's Polynomials and their properties.	7
Partial Differential Equations: The derivation of equations, wave equation, solution by boundary initial conditions, applications to engineering problems.	6
Vector Calculus: Gradient of a scalar field, divergence and curl of a vector field, Physical significance of gradient, divergence and curl, various formula involving gradient divergence and curl, Vector integration (line, surface and volume integral), Green's theorem in the plane, Gauss' divergence theorem, Stokes' theorem, applications of vector calculus to engineering problems.	12

ELECTRICAL CIRCUITS AND MACHINES (EE 131) 4 credit, 4 periods/week	**No. of Lectures**
Theory Introduction: Ohm's law, KVL, KCL, concept of series and parallel circuits, maximum power transfer theorem, Star-Delta conversion, branch current analysis, loop current analysis, nodal analysis, source conversion method, Thevenin's theorem, Norton's theorem, superposition theorem.	16
Introduction to measuring instruments (Voltmeter, Ohmmeter, Wattmeter). Extention of range of ammeter and voltmeter.	3
Alternating instantaneous voltage, current and power- R, L, C, R-L, R-L-C branch. Effective current and voltage, average power and phasor algebra.	3
Introduction to poly-phases circuit, power in 3-phase circuit and its measurement.	3
Magnetic concepts and units, magnetic force between current carrying conductors.	3
Electromagnetic torque, DC generator, constructional features,	3

principles of operation, starting and speed control, applications. **DC Motors**: Constructional features, principles of operation, starting and speed control, applications. **Transformer**: Constructional features, principles of operation, equivalent circuits and laboratory testing, introduction to three phase transformers. Induction motor and its characteristics and control, constructional features, principles of operation, uses. Synchronous motor and its characteristics and control, constructional features, principles of operation, uses.	 4 4 4 4
ELECTRICAL CIRCUITS AND MACHINES (EE 132) 0.75 credit, 3/2 periods/week **Sessional** Experiments based on **EE 131**.	
COMPUTING BASICS (ME 181) 3 credit, 3 periods/week	**No. of Lectures**
Theory **Hardware:** Concept of Computer Hardwares, CPU and its components (RAM, ROM). **Networking:** Concept of Networking, Types, Components. Equipments of Network: Router, Switch, Fiber Optic Line, Wireless Communication System etc. **Software**: Types, acquaintance with operating systems, acquaintance with different standard softwares and their uses, softwares for word processing and office management, database management, website design, MIS design etc., softwares for design and drafting, etc., computer trouble shooting and system set up procedure.. **User Softwares**: Concept of machine language, compiler, Procedure for writing a user program, algorithms, flowcharts, FORTRAN and **C/C^{++}** Programming Language: Preliminaries,	4 4 6 25

Problem Solving Steps, Sequential Structure, Selective Structure, Repetitive Structure, Format Directed Input/Output, Arrays, Subprograms, Introduction to modern programming languages.	
COMPUTER PROGRAMMING (ME 182) 1.5 credit, 3 periods/week	**Weeks**
Sessional Solution of simple problems using FORTRAN language. Writing and running programs for the solution of Engineering and Mathematical problems using C / C^{++} language. Assignment for writing programs.	 3 9
MACHINE AND FITTING SHOP (ME 154) 0.75 credit, 3/2 periods/week	**Weeks**
Sessional Shop safety practices, acquaintance with tools used in fitting shop, e.g. marking, holding, chiseling, filing, sawing etc. Tools, practical jobs on the use of tools, use of taps and dies. Acquaintance with different cutting tools and machine tools, operation and maintenance of different machine tools, plain and taper turning, thread cutting, doing jobs by using drilling and grinding machines.	6

MECHANICAL ENGINEERING
B. Sc. ENGINEERING LEVEL–2 (TERM -I)

Sl. No.	Course No.	Course Title	Contact hour/week	Credits
		THEORY		
1	Math231	Statistical Analysis and Complex Variable	3	3
2	Hum231	Technical English and Communication Skill	3	3
3	ME211	Thermodynamics	3	3
4	ME231	Engineering Mechanics-1	3	3
5	ME251	Production Process	4	4
		SESSIONAL/LABORATORY		
6	ME212	Thermodynamics	3/2	0.75
7	ME232	Engineering Mechanics-1	3/2	0.75
8	ME252	Production Process	3/2	0.75
9	ME272	CAD and Design Softwares	3	1.5
10	HUM232	Technical English and	3/2	0.75

		Communication Skill Sessional		
			25	20.5

Contact Hours: 16 (Theo.) + 9 (Lab.) = 25 hours/week
Theory Courses = 05
Total Credits = 20.5
Laboratory Courses = 05

No. of

No. of

COURSE CONTENT

STATISTICAL ANALYSIS AND COMPLEX VARIABLE (MATH 231) 3 credit, 3 periods /week	**No. of Lectures**
Statistical Analysis: Regression and correlation analysis, Curve fitting, Method of least square, Elementary probability theory, Random variable, Probability distribution function, moment generating function, Binomial distribution, Negative Binomial distribution, Geometric distribution, Poisson distribution, Normal distribution, Exponential distribution, Physical significance and practical examples of such distributions, Central limit theorem, Estimation, Hypothesis testing.	19
Complex Variable: Introduction, Complex number system, De Moivre's theorem, limit, continuity and differentiability of complex functions, Analytic function and Cauchy-Riemann equations, Complex line integral, Cauchy's theorem, Cauchy's integral formula, Infinite series in the complex plane, Taylor's expansion, Laurent's expansion, singular points, The Residue theorem, Evaluation of residues, Contour integration, Conformal mapping, Bilinear transformation, Cross ratio, Application to fluid and heat transfer problems.	20

TECHNICAL ENGLISH AND COMMUNICATION SKILL (HUM 231) 3 credit, 3 periods/week	**No. of Lectures**
Grammar: Functions and structures of word classes: noun, adjective, adverb and preposition. Phrase: its structure and functions. Clause: its functional and structural categories. Basic sentence: its properties, and patterns; sentence analysis, transformation and synthesis. Punctuation, and common mistakes in English	10

Undergraduate Bulletin

Listening: Its purposes, and kinds; listening approaches: bottom up versus top down; listening steps; listening skills; barriers to effective listening; ways to be an effective listener	5
Speaking: Forms and challenges of spoken communication; speech delivery and its types; pre, while, and post activities of effective presentation, and interview skills	5
Reading: Various approaches to reading; reading techniques and readability; academic texts: its types and features; reading abstract; facts and opinion, and critical thinking	5
Writing: Various stages; and potential extrinsic and intrinsic factors of writing. Principles of paragraph writing; paragraph structure; development of ideas, and types of paragraph. Functional categories of writing: descriptive, narrative, argumentative and persuasive. Academic writing: its features and types. Common mistakes in academic writing. Technical writing and its features; technical report: its elements, structure and purposes. Organization of letter; job application, and CV; request letter; invitation letter; order letter, and letter of adjustment or complaint. Tender notice: its types and forms	14

Technical English and Communication Skill Sessional (HUM 232) 0.75 credit, 3/2 periods/week	**Weeks**
1. Listening Skill: listening to recorded texts, class lectures, conversations, monologues, and practicing to take useful notes based on listening. 2. Speaking skill: self-introduction and introducing others, different manners of speaking (Greetings, giving advice and opinion, instructions and directions, requests, complaints, apologies, describing people and places, narrating events, group discussion and oral presentation. 3. Reading skill: applying various approaches to reading (Skimming, scanning, predicting, inferring, SQ3R/4R) in analyzing and interpreting variety of texts, and practicing comprehension from literary and non-literary texts. 4. Writing skill: practicing writing: academic and non-academic writing and the writing process. Generating sentences to from paragraphs, practicing writing	6

abstract introduction, conclusion, description, narration, argumentation, classification, comparison and contrast, cause and effect, evidence and opinion, and interpreting data (charts graphs, diagrams, tables, etc.).	

THERMODYNAMICS (ME 211) 3 credit, 3 periods/week	**No. of Lectures**
Theory	
Second Law Of Thermodynamics: Limitation of the first law of thermodynamics, heat engines and heat pumps, Second law of thermodynamics and its corollaries, Carnot and reversed Carnot cycle. Entropy and its usages in different systems.	8
Exergy analysis: Availability, Exergy transfer, Exergy destruction, Exergy efficiency, exergy balance for closed and control volume system. Third law of thermodynamics.	3
General Thermodynamics Relations: Exact differential, Maxwell's relations, derivation of some useful general thermodynamic relations, TdS equations, Joule-Thomson coefficient.	5
Power Cycles: Vapor power cycle; Rankine cycle; reheat cycle and regenerative cycle; calculations of cycle efficiency.	5
Gas Turbine: Constant volume and constant pressure combustion gas turbines; air standard Brayton cycle; p-v and T-s diagrams; calculations of cycle efficiency; power calculations.	4
Perfect Gas :Equation of state of a perfect gas; internal energy, enthalpy and specific heat capacities of a perfect gas; coefficient of volume expansion and isothermal compressibility for a perfect gas; various reversible processes undergone by a perfect gas, Perfect gas mixtures; Gibbs-Dalton law; relations involving pressure, volume and composition, internal energy, enthalpy and specific heats of mixtures.	4
Fuels And Combustion Processes: Types of fuels; calorific values; combustion processes; analysis of the products of combustion; enthalpy of formation; enthalpy and internal energy of combustion; first law analysis of reacting systems; adiabatic flame temperature; evaluation of actual combustion process.	6
Reciprocating Compressors: Work of compression; single stage compressor; multistage compressor with inter cooling; volumetric efficiency.	4

THERMODYNAMICS (ME 212) 0.75 credit, 3/2 periods/week	**Weeks**
Sessional	
Experiments based on part ME211 1) Determination of calorific value of fuel by Bomb and Gas calorimeter. 2) Measurement of viscosity of lubricants. 3) Distillation of petroleum fuel. 4) Determination of flash point and fire point of diesel and petrol. 5) Determination of specific humidity, relative humidity and dew point. 6) Determination of volatile materials and moisture content in coal. 7) Analysis of exhaust gas by Orsat apparatus. 8) Use and calibration of speed measuring instruments, wind velocity measuring instruments and temperature measuring instruments. 9) Experiments on heat pump and air cooler.	6

ENGINEERING MECHANICS-I (ME 231) 3 credit, 3 periods/ week	**No. of Lectures**
Theory	
Equilibrium of Particles: Resultant of forces, resolution of forces, conditions for equilibrium, moments of force in vector notation, resultant of force couple system.	3
Equilibrium of Rigid Bodies: Components of forces in plane and space, moment of forces and couples, resolution of a given force or force system into a force and couple, Reactions at supports and connections for two and three dimensional structures, Free body diagram, Equilibrium of two-force and three-force body, Equilibrium of rigid body in two and three dimensions.	6
Analysis of Structures: Trusses, frames and machines, forces in members, zero force member.	4
Methods of Virtual Works: Principle of virtual work, stability of elastic system /structures	4

Friction: dry friction, wedge friction, screw friction, bearing friction, belt friction, pivot friction, wheel friction and rolling resistance.	4
Belt, Rope and Chain Drive: Belt: types: flat and V- belt, selection, length of open and cross belt drives, power transmitted by belt, ratio of driving tension, condition for transmission of maximum power, rope drive, ratio of driving tensions for rope, chain drive, kinematics of chain drive.	4
Centroid and Center of Gravity: of line, area, volume, composite bodies, Puppus and Guldinus theorem	4
Moment of Inertia: of area and masses, parallel axis theorem, radius of gyration, product of inertia.	4
Power Transmission Devices **Toothed Gearing**: Law of gearing, velocity of sliding in the mating teeth, forms of teeth, length of path and arc of contact, interference, motion and torque transfer by helical, spiral, bevel and worm gear.	3
Gear Train: Analytical and tabular methods of simple, compound and epicyclic gear trains; compound epicyclic trains and their applications. Torque transfer by gear train.	3
ENGINEERING MECHANICS - I Sessional (ME 232) 0.75 credit, 3/2 periods/ week	**Weeks**
Sessional A. Solution of problems based on **ME231** B. Study and experiments on: i) Resolution and combination of forces ii) Friction- a) Sliding friction, b) Inclined plane, c) Angle of friction, d) Rolling friction, e) Principle of wedges, f) Anti-friction bearings. iii) Beams - a) Principle of moments b) The beam balance, c) Levers, d) Beam reactions. iv) Lifting devices - a) Pulleys, b) Differential wheel and axle, c) Weston differential chain block. v) Belt and chain drives a) Simple belt drives, b) Belt friction vi) Gearing -a) Simple gear trains, b) Bevel gears, c) Worm gears, d) Screw jack. vii) Pure Mechanisms - a) Cam and Roller Mechanism, b) Geneva Mechanism., c) Ratchet Mechanisms. viii) Crank Mechanism - a) Simple crank Mechanism, b) Toggle Mechanism c) Quick Return Mechanism.	7

PRODUCTION PROCESS (ME 251) 4 credit, 4 periods/week	**No. of Lectures**
Theory **Casting**: Methods of sand casting, design of patterns, properties of molding sand, core and core making, casting in metallic and nonmetallic moulds, die casting, centrifugal casting, precision investment casting, continuous casting. Defects of casting, causes and prevention.	8
Chipless Metal Forming Process: Hot and cold working processes, rolling, properties of rolled products, cold drawing, forging, coining, stretching, bending, squeezing, extrusion, machines and tools for metal forming processes. Metal shearing operations, stamping, press and press tools.	8
Welding and Allied Processes: Principle, equipment's, gas storage and safety measures. Arc welding: principle, equipments used; AC and DC arc welding, electrodes, Shielded arc welding: TIG, MIG and plasma arc welding; electrical resistance welding. Special welding techniques: thermit welding, LASER beam welding, brazing, soldering and braze welding, continuous welding. Welding job preparation, weldability, welded joint inspection, welding defects and causes of defects.	8
Moulding of Plastics and Powder Metallurgy: Different methods of plastic moulding. Powder metallurgy: production of metallic powders, sintering and hot pressing, applications.	4
Metal Cutting Chip formation, types of chips, chip breakers, cutting forces, cutting fluid, tool geometry, cost and life.	6
Machining Process: Lathe machine and accessories, types of lathes, drill machine, shapers and planners, milling, Gears and threads: manufacturing. Finishing operation: grinding, honing, lapping, super-finishing.	14
Modern Manufacturing Processes: ECM, EDM, USM, processing of synthetic materials.	4

PRODUCTION PROCESS (ME 252) 0.75 credit, 3/2 periods/week	Weeks
Sessional Study of machine tools, Jobs on taper turning, threading, slotting, gear cutting, surface grinding, drilling other machining operation, single point cutting tool manufacturing, design of pattern, jobs on moulding and casting.	6

CAD AND DESIGN SOFTWARES (ME 272) 1.5 credit, 3 periods/week	Weeks
Sessional Machine part drawing, assembly drawing using Auto CAD, Preparing the complete working drawing (detail and assembly) using Auto CAD. CAD project.	6
Design and Drafting Software: Using Pro-engineer/ Solid Works as a drafting and design tool for solving engineering design problems. **Simulation:** Flow simulation, Load simulation	6

MECHANICAL ENGINEERING
B. Sc. ENGINEERING LEVEL-2 (TERM-II)

Sl. No.	Course No.	Course Title	Contact hour/week	Credits
THEORY				
1	Hum233	Economics	2	2
2	Math233	Operational Calculus and Matrix	4	4
3	EE231	Electronics and Microprocessor	4	4
4	ME233	Engineering Mechanics –II	3	3
5	ME235	Mechanics of Solids	3	3
SESSIONAL/LABORATORY				
6	EE232	Electronics and Microprocessor	3	1.5
7	ME234	Engineering Mechanics –II	3/2	0.75
8	ME236	Mechanics of Solids	3/2	0.75
9	ME282	MATLAB	3	1.5
			25	20.5

Contact Hours: 16 (Theo.) + 9 (Lab.) = 25.0 hours/week
No. of Theory Courses = 05

Total Credits = 20.50
No. of Laboratory Courses =04

COURSE CONTENT

ECONOMICS (Hum 233) 2 credit, 2 periods/week	No. of Lectures
Fundamental Concepts: Definition and scope of economics, demand and supply and their elasticity, market equilibrium, consumer behavior and producer behavior, cost and revenue theory, price theory under different market structure, market economy and mixed economy.	8
Introduction to Income Determination: Basic concepts-GNP, GDP, investment, inflation demand and supply side equilibrium, fiscal policy and monetary policy, demand and supply in the labor market and its equilibrium.	6
Development Economics Models and Methods: Growth vs. development, input–output analysis, tax structure and their applicability in Bangladesh, share market, foreign currency reserves, economic planning and development problems related to technology, agriculture, industry and population of Bangladesh, characteristics of five years plan of Bangladesh.	7
International Economics: The pure theory of international trade, theory of commercial policy WTO, IMF and world bank, theory of economic integration.	4

OPERATIONAL CALCULUS AND MATRIX (Math 233) 4 credits, 4 hours /week	No. of Lectures
Laplace Transform: Introduction, different properties of Laplace transform, inverse Laplace transform, convolution theorem, solution of differential equation applying Laplace transform. Application to Engineering problems.	14
Fourier Series and Integrals: Fourier series, Euler coefficients, half range expansion, Fourier integral, application of Fourier series.	12
Fourier Transform: Fourier cosine and sine transforms, Inverse Fourier transform, Physical interpretation of Fourier transforms,	12

Finite transform and their uses in solving boundary value problems, Application to engineering problems. **Matrix**: Different types of Matrices, Inverse of a matrix, Elementary transformation of matrix, System of linear equations and their solutions, Eigenvalues and eigenvectors, Cayley-Hamilton theorem, Quadratic form, applications, Application to engineering problems.	14
ELECTRONICS AND MICROPROCESSOR (EE 231) 4 credit, 4 periods/week	**No. of Lectures**
Theory **Electronics:** Semiconductor materials, semiconductor diodes and rectifiers, bipolar junction transistor, bipolar junction transistor biasing, field effect transistor and their characteristics, CMOS. Feedback amplifiers, operational amplifiers, push-pull amplifier, introduction of filter and their uses. Introduction to SCR and its application. Introduction to IC and VLSI technology.	25
Digital Electronics: number system, Boolean algebra, logic gates and combinational circuits, half adder, full adder, decoder, multiplexer, flip-flops, counters and registers.	16
Microprocessors: Introduction to different types of microprocessors, microprocessor evolution, architecture and operation, pin diagram and functions of microprocessors. Assembly language programming.	8
Semiconductor Memory: RAM, SRAM, ROM, DRAM, PLA, cache memory.	2
ELECTRONICS AND MICROPROCESSOR (EE 232) 1.5 credit, 3 periods/week	
Sessional Experiments based on **EE 231**.	

ENGINEERING MECHANICS-II (ME 233) 3 credit, 3 periods/ week	**No. of Lectures**
Theory **Kinematics of Particles:** Rectilinear and curvilinear motion of particles, position vector, velocity and acceleration, derivative of vector functions, Dependent motion, Motion of projectile	4
Kinetics of Particles in Two Dimensions: Newton's second law of motion- dynamic equilibrium, angular momentum and its rate of change, motion under a central force and its application to space mechanics, Kepler's laws of planetary motion.	6
Energy and Momentum Methods: principle of work and energy; conservation of energy; principle of Impulse and momentum; impulsive motion, impact, linear and angular momentum of system of particles.	7
Kinematics of Rigid Bodies in Two Dimensions: Translation, rotation about a fixed axis, absolute/relative velocity and absolute/relative acceleration in plane motion, instantaneous center of rotation.	6
Plane Motion of Rigid Bodies: Equation of motions for a plane body, Angular momentum and its rate of change, D'Alemberts principle; constrained plane motion; principle of work and energy; conservation of energy and angular momentum; principle of Impulse and momentum; eccentric impact, systems of rigid bodies.	8
Kinetics of Rigid Bodies in Three Dimensions: Angular momentum, application of the principle of impulse and momentum, motion of a rigid body in 3-dimensiona, Eulerians equation of motion, motion about a fixed point and axis, motion of a gyroscope and Eulerion angles.	7
ENGINEERING MECHANICS-II Sessional (ME 234) 0.75 credit, 3/2 periods/ week	**Weeks**
Sessional A. Solution of problems based on ME233	3
B. Experiments on following topics. i) Potential and kinetic energy	4

ii) Dynamics of particles. iii) Flywheel iv) Journal bearing friction. v) Simple and compound Pendulum. vi) Spring mass system, etc.	
MECHANICS OF SOLIDS (ME 235) 3 credit, 3 periods/week	**No. of Lectures**
Theory **Simple Stress and Strain**: Introduction, analysis of internal forces. Tension, compression, shear stress, axial stress in composites. Shearing, bending, centrifugal and thermal stresses, strain and deformation, stress-strain diagram, elasticity and elastic limits.	3
Modulus of Elasticity and Rigidity: Definition of some mechanical properties of materials, Poission's ratio, volumetric strain and bulk modulus. Relation between modulus of elasticity and bulk modulus, statically indeterminate members. Stresses in thin-walled and thick-wall members.	5
Statically Determinate Beams: Introduction, different types of loading and supports, shear force and bending moment diagram, various types of stresses in beams, flexure formula, economic sections, shearing stress in beam, general shear formula, deflection of beams, elastic curve, method of double integration, area moment method	15
Statically Indeterminate Beams: Redundant supports in propped and restrained beams, solution by double integration. Area moment method, design of restrained beams, continuous beams, three moment equation, determination of support reactions of continuous beam	5
Torsion: Torsion formula, angle of twist of solid and hollow shaft, torsional stiffness and equivalent shaft, helical spring.	3
Combined Stresses and Strains: Principal stresses and principal planes, combined axial and bending stresses, stress at a point, stress on inclined cutting planes, analytical method for the determination of stresses on oblique section, Mohr's circle, application of Mohr's circle to combined loading. Transformation of strain components, strain rosette.	4

Column Theory: Introduction to elastic stability, Euler's formula for central load and different end conditions, modes of failure and critical load, slenderness ratio and classification of columns, empirical formula for columns, secant formula for columns with eccentric loading.	3
Special Topics: Curved Beams, Castigliano's theorem	1
MECHANICS OF SOLIDS (ME 236) 0.75 credit, 3/2 periods/week	Weeks 6
Sessional Experiments based on ME 235 1) Tensile test 2) Compression test 3) Hardness test 4) Impact test 5) Fatigue test 6) Determination of stresses in thick and thin walled cylinder.	
MATLAB (ME282) 1. 5 Credits 3 periods/week	**Weeks**
Matlab as {best} calculator, Standard Matlab Windows.	1
Operations With Variables: Naming, checking existence, clearing, and operations.	1
Arrays: Columns and rows- creation and indexing, size and length, multiplication, division, power, and operations.	1
Writing Script Files: Logical variables and operators, flow control, loop operators.	1
Writing Functions: Input/output arguments, function visibility, path.	1
Simple graphics: 2D plots, figures and subplots.	1
Applications: Basic principles of linear algebra, matrix notation, and solution of linear algebraic equations. Basic numerical methods for solving linear and nonlinear algebraic equations, and linear and nonlinear differential equations. Basic understanding of structural analysis, dynamics, machine design, control, heat transfer.	5

MECHANICAL ENGINEERING
B. Sc. ENGINEERING LEVEL-3 (TERM-I)

Sl. No.	Course No.	Course Title	Contact hour/week	Credits
		THEORY		
1	ME311	Conduction and Radiation	3	3
2	ME321	Fluid Mechanics–I	3	3
3	ME331	Mechanics of Machinery and Vibration	3	3
4	ME361	Measurement and Quality Control	3	3
5	ME381	Numerical Methods in Engineering	3	3
		SESSIONAL/LABORATORY		
6	ME312	Conduction and Radiation	3/2	0.75
7	ME322	Fluid Mechanics – I	3/2	0.75
8	ME332	Mechanics of Machinery and Vibration	3	1.5
9	ME362	Measurement and Quality Control	3/2	0.75
10	ME382	Numerical Methods in Engineering and MATLAB	3	1.5
			25.5	20.25

Contact Hours: 15 (Theo.) + 10.5 (Lab.) = 25.5 hours/week
No. of Theory Courses = 05
Total Credits = 20.25
No. of Laboratory Courses =05

COURSE CONTENT

CONDUCTION AND RADIATION (ME311) 3 credit, 3 periods/week	**No. of Lectures**
Theory **Introduction:** Modes of heat transfer, Mechanism of heat transfer, thermal conductivity and thermal diffusivity	3
Conduction Fourier law of heat conduction for isotropic material. Derivation of general heat conduction equation. **Steady-State One-Dimensional Heat Conduction**: Steady-state one dimensional conduction problem for plane wall, cylinder and sphere for without and with heat source. Variable thermal conductivity. Multilayer problems. Overall heat transfer coefficient. Analogy with electrical circuits. Critical thickness of insulation. Thermal contact resistance. Fins-rectangular triangular and pin fins. Fin effectiveness and efficiency. Fin performance parameter.	17
Steady State Two-Dimensional Conduction: Analytical and numerical solutions.	4
Unsteady State Conduction: Lumped heat capacity system, significant of time constant. Biot and Fourier number. Transient heat flow in a semi-infinite solid, transient heat flow with a convection boundary condition	4
Radiation Physical mechanism of thermal radiation. Laws of radiation. Wein's displacement law. Black body, emissive power. Radiation intensity. Plane angle and Solid angle. Radiation properties. Irradiation, radiosity. Kirchhoff's identity, concept of gray body, radiation shape factor, heat exchange between nonblack bodies, infinite parallel planes, concentric spheres and long cylinders, enclosure problems, radiation shields, solar radiation, gas radiation.	11

CONDUCTION AND RADIATION (ME312) 0.75 credit, 3/2 periods/week	Weeks
Sessional Experiments based on ME311 course such as 1. Measurement of thermal conductivity of different solid metals. 2. Determination of fin efficiency. 3. Electrical network analogy. 4. Conduction through composite wall. 5. Radiation heat transfer. 6. Determination of thermal conductivity of fluid.	6

FLUID MECHANICS-I (ME321) 3 credit, 3 periods/week	**No. of Lectures**
Theory **Introduction**: Fundamental concept of fluid as a continuum; Fluid properties.	6
Fluid Statics: Basic hydrostatic equation, pressure variation in static in compressible and compressible fluids; Manometers;	12

Forces on submerged plane and curved surfaces; Buoyant force; Stability of floating and submerged bodies; Pressure distribution of a fluid in rotating and accelerating systems.	
Kinematics of Fluid Flow: Velocity and acceleration of fluid particles, types of fluid flow, Concepts of system and control volume. Reynolds transport theorem (RTT) and its applications.	3
Fluid dynamics: Continuity, momentum and energy equations and their applications; Pressure, Velocity and Flow measurement devices. Flow through sharp edged orifice, the pitot tube, the venturi-meter, the flow nozzle and orifice meter, notches and sharp crested weirs. Momentum equation for inertial control volume, application of momentum principle for incompressible fluids in variable area duct. Impact of jet on fixed and moving vanes. Application of momentum principle for jet propulsion and propellers. Momentum correction factor: Force caused by a flow round a pipe-bend, force at nozzle and reaction of a jet, force on solid body in a flowing fluid	12
Dimensional Analysis: Fundamental and derived units, Dimensional homogeneity, Buckinghum theorem, significance of dimensionless numbers, Application of dimensional analysis in fluid flow problems.	6

FLUID MECHANICS-I (ME322) 0.75 credit, 3/2 periods/week	Weeks 6
Sessional Experiments based on ME321 1. Determination of coefficient of discharge by orifice. 2. Flow measurement by V notch. 3. Flow measurement by rectangular notch. 4. Flow measurement by mouth pieces. 5. Determination of co-efficient of discharge by venturimeter. 6. Determination of time of emptying of a tank. 7. Verification of Bernaullis equation. 8. Determination of force due to impact of jet etc.	

MECHANICS OF MACHINERY AND VIBRATION (ME331) 3 credit, 3 periods/week	**No. of Lectures**
Theory **Mechanism**: Basic concepts, structure of mechanisms, kinematic pairs and their classification, degree of freedom of mechanisms,	2

redundant constrains and redundant degree of freedom of linkage, main types of mechanisms.	
Linkage of Bars: Structure of linkage. Graphical and analytical methods: Kinematic analysis of planer linkages with lower kinematic pairs and position, velocity, acceleration analysis. Transmission of forces and torques through mechanisms. Force analysis of linkages.	7
Dynamic Force Analysis: Newtonian Solution Method, Single Link in Pure rotation, force analysis of a three-bar crank-slide linkage, force analysis of a four-bar linkage, shaking forces and shaking torque.	3
Flywheel and TMD: Inertia and kinetic energy of rotating and reciprocating masses, turning moment diagram, design of flywheel.	3
Governors: Types of governor and governing, working principles of different types of governor, controlling force curves, governor stability, sensitiveness, effort and power of governor, isochronism, hunting.	3
Cam and Follower: Classification, specified motion of followers, cam profiles construction. Cams with specific contours, position, velocity, acceleration and jerk analysis.	3
Vibration: Introduction, importance to engineers. **Free Vibrations**: Longitudinal and transverse, natural frequency, effect of inertia of constraint, natural frequency of vibrations due to point load, uniformly distributed load etc. on shaft (simply supported, ends fixed), whirling of shaft-critical speed. Free vibration system having more than one degree of freedom. Passive vibration system.	5
Forced Vibrations: un-damped and damped vibration of single degree of freedom.	2
Torsional Vibration: Natural frequency of free torsional vibration, effect of inertia of constraints on torsional vibration, free torsional vibrations in single/multiple rotor systems, torsionally equivalent shaft, free torsional vibration of a geared system, free vibration of rigid bodies.	4
Vibration isolation and transmissibility; Isolator materials; Vehicle suspension; Vibration measuring instruments.	1
Balancing: Static and dynamic balance, condition of balancing,	6

balancing of rotating and reciprocating masses; balancing of locomotive, opposed cylinder engine; concept of direct and reverse cranks; balancing of multicylinder in-line engine, V-engine, and radial engine; balancing machines.

MECHANICS OF MACHINERY AND VIBRATION (ME332) 1.5 credit, 3 periods/week	Weeks
Sessional Introduction to synthesis. Classification of kinematic synthesis problems. Spacing of accuracy points for function generation. Analytical design of four-bar linkage as a function generator. Curve matching. Graphical approach. Four bar linkage as a path generator.	6
A. Solution of Problems based on ME331. B. Study and Experiments on 1. Demonstration of various types of mechanism (e.g. Geneva mechanism, scotch yoke, quick return mechanism, slider crank, four bar mechanism, Old-ham coupling, Hook's joint etc.) 2. Production of travel, speed and acceleration curves for three different types of cams and cam profile drawing. 3. Demonstration of simple and compound gear train. 4. Study of free undamped and damped vibrations. 5. Study of Forced undamped vibration. 6. Study of Forced damped vibration. 7. Whirling of shaft. 8. Static and dynamic balancing of a multimass system. 9. Balancing of Reciprocating masses. 10. Application of Matlab.	6

MEASUREMENT AND QUALITY CONTROL (ME361) 3 credit, 3 periods/week	**No. of Lectures**
Theory: **Basic principles of measurements:** Measuring and recording methods, instrument calibration; Measurement of displacement, pressure, temperature, heat-flux, flow, motion and vibration, force, torque, strain, etc.; Data acquisition, analysis and processing; Sources of error in measurements, Error analysis.	9
Techniques: Techniques for maintaining standards, allowances and tolerance. Types of tolerance, grades of manufacturing accuracy, limits and fits, types of fits. Basic hole system and basic shaft system, selective assembly and interchangeable manufacturing, limit gauges, Taylor's principle of limit gauging.	6
Measuring tools for angles and tapers; Instruments for checking straightness and flatness and for alignment test; Gear measurement; Measurement of surface finish, and surface roughness.	3
Introduction to Nondestructive testing, types and application	1
Statistical Quality Control: **Statistics and Probability**: Review of probability, distribution functions e.g. Binomial, hypergeometric, poission, normal, exponential, Erlangian, Gamma and Weibull distribution.	3
Quality Control: Objectives, quality and quality assurance, TQM; concepts and tools, statistical quality control (SQC), concepts of control charts, control charts for variables and attributes e.g. X, R, C , P etc. charts, drawing of control charts and selection of subgroups, acceptance sampling and sequential sampling.	15
Quality Assurance Programs: ISO, SA standards, requirements and certification procedure.	2

STATISTICAL QUALITY CONTROL (ME362) 0.75 credit, 3/2 periods/week	Weeks
Sessional Use of measuring instruments: Measurement of taper, angles, radius of curvature, straightness and flatness, eccentricity, screw thread and gear, performance tests of machine tools.	6

NUMERICAL METHODS IN ENGINEERING (ME381) 3 credit, 3 periods/week	**No. of Lectures**
Theory **Numerical Analysis**: Applications of Numerical Methods in Engineering. Solutions of linear equations: Iterative method, Newton-Raphson method, Gauss's method, Matrix method, Iteration method.	9

Undergraduate Bulletin

Interpolation: Applications of interpolation formula in real life problems. Finite differences, interpolation formula, Newton's formula for forward and backward interpolation. Lagranges interpolation formula, Striling's interpolation formula, Gauss's central difference formula, Bessel's interpolation formula.	11
Numerical Differentiation: Use of interpolation formula, graphical method.	3
Numerical Integration: Applications of numerical integration in engineering. General formula for equidistant ordinates, Trapezoidal rule, Simpson's rule, Gauss's formula. Use of Lagranges interpolation, graphical integration.	4
Solutions Of Differential Equations By Numerical Methods: Applications of ordinary differential equations. Solution by Taylor's series, Picards method, Euler's method, Runga Kutta method.	6
Finite Element Method: Introduction of Finite element method in Engineering, Applications of finite element analysis, Finite element modeling.	2
Variational methods of approximation: The Rayleigh-Ritz method, The method of weighted residuals, The Petrov-Galerkin method, The Galerkin method, The least-square method, The collection method.	4
NUMERICAL METHODS IN ENGINEERING AND MATLAB (ME382) 1.5 credit, 3 periods/week	**Weeks**
Sessional **Numerical Methods:** Writing computer programs using C/C^{++} language for the solution of problems based on ME 381 course and running the programs.	8
MATLAB: Using MATLAB to solve problems based on ME 381.	4

MECHANICAL ENGINEERING
B. Sc. ENGINEERING LEVEL-3 (TERM-II)

Sl. No.	Course No.	Course Title	Contact hour/week	Credits
THEORY				
1	Hum331	Industrial Law and Accounting	3	3
2	ME323	Fluid Mechanics-II	3	3
3	ME313	Convection and Mass Transfer	3	3
4	ME333	Machine Design-I	3	3
5	ME351	Engineering Metallurgy	3	3
SESSIONAL/LABORATORY				
6	ME324	Fluid Mechanics-II	3/2	0.75
7	ME314	Convection and Mass Transfer	3/2	0.75
8	ME334	Machine Design-I	3/2	0.75
9	ME352	Engineering Metallurgy	3/2	0.75
			21.0	18.0

Contact Hours: 15 (Theo) + 6 (Lab) = 21.0 hours/week
No. of Theory Courses = 05
Total Credits = 18.00
No. of Laboratory Courses =04

COURSE CONTENT

INDUSTRIAL LAW AND ACCOUNTING (HUM331) 3 credit, 3 periods/week	**No. of Lectures**
Industrial Law Industrial laws in Bangladesh. Various laws relating to wages, working hours, health, safety and other condition of work. Legislation affecting employment in factories, shops, mines, and agriculture.	6
Laws governing labor relations: Collective bargaining, Trade union, arbitration and conciliation, labor contract, lay off, lock out, strike and their legality, labor court and tribunals.	4
ILO: The influence of I.L.O. on labor relations and welfare of labors. Law of social Insurance, legislation for the control of industries.	2
Accounting Definition of accounting, accounting concept and convention. Definition of book-keeping, objects and advantages of book-keeping, principles of double entry book-keeping.	5
The nature of transaction, classification of accounts, rules for debit and	2

credit. Kinds of cheques and treatment of cheques in accounts. Journal posting, balancing and closing, trial balance, functions, preparation of trial balance, limitations of trial balance, financial statements, analysis of financial statement.	9
Cost Accounting: Introduction, reasons for cost accounts, recorded cost, estimated cost, standard cost, elements of cost, cost statement, sources of cost data, , distribution of overhead charges, stores ledger, marginal costing, break even point, margin of safety, p/v ratio.	7
Budgeting: Types of budgets, preparing budgets and budgetary controls.	3

FLUID MECHANICS-II (ME323) 3 credit, 3 periods/week	**No. of Lectures**
Theory	
Viscous Incompressible Flow: Viscous flow in pipes, laws of fluid friction. Darcy-Wisbech equation. Chezy, Manning and Hazen-williams' formulae; Laminar flow, shear and pressure gradient in laminar flow, Hagen-Poiseuille law. Laminar flow through inclined pipes, annulus and parallel plates. Shear stresses in turbulent flow. Eddy viscosity, expression for friction factor in turbulent flow. Energy correction factors for laminar and turbulent pipe flow. Moody chart and its use. Flow in multiple-pipe systems. Introduction to Navier-Stokes equations.	12
Boundary Layer Theory: General concept, boundary layer thickness, characteristics of boundary layer, boundary layer on a flat plate with zero pressure gradient, friction drag due to boundary layers, effect of pressure gradient, transition for flat plate flow. Separation, wake behind a cylinder. Lift and Drag forces on immersed bodies. Flow around a cylinder with and without circulation; Magnus effect and introduction of vehicle aerodynamics.	8
Open Channel Flow: Chezy equation, optimum shape of flow cross section, specific energy and critical depth, Froude number and its significance in channel flow, hydraulic jump.	5
Ideal Fluid Flow: Rotational and irrotational motions; circulation and vorticity; velocity potential; stream function. Relationship between stream function and velocity potential; stream lines, equipotential lines and flownets, vortex motion, free and forced vortex motion; doublet; simple flows; superposition of simple flows; flow around a cylinder with and without circulation; Magnus effect and aerodynamic lift.	9
Compressible flow: Speed of sound wave; Stagnation states for the flow of an ideal gas; Flow through converging-diverging nozzles; Normal shock.	5

FLUID MECHANICS-II (ME324) 0.75 credit, 3/2 periods/week	Weeks
Sessional Experiments based on ME323 1. Study of laminar and turbulent flow. 2. Determination of head loss due to friction, bend, sudden expansion, sudden contraction, in gate and globe valves. 3. Determination of lift and drag forces on aero foil and other models. 4. Determination of boundary layer thickness. 5. Flow visualization past different models. 6. Measurement of energy loss in hydraulic jump etc.	6

MACHINE DESIGN-I (ME333) 3 credit, 3 periods/week	**No. of Lectures**
Theory	
Objectives of machine design, basic requirements for the design of machine elements and machines, approach to design, design methods and procedures, system design cycle.	2
Stress Analysis: Simple and combined stress; material and their properties, manufacturing considerations in design.	6
Theories of Failure: Failure of ductile materials and failure of brittle materials.	3
Variable loads and stress concentration, notch sensitivity, fatigue and fatigue failure.	9
Joints: Power screw, screwed joints, riveted joints, welded joints.	7
Springs: Design of compression, extension and torsional springs in static and dynamic loading, leaf spring.	6
Columns: Design of column with central and eccentric loading.	2
Levers and compliant mechanisms.	2
Application of softwares in design.	1

MACHINE DESIGN-I (ME334)

0.75 credit, 3/2 periods/week

	Weeks
Sessional	
Design and check problems based on ME333.	
A. **Individual Design Project Assignment**: Students should design a complete mechanism of a machine with the design of relevant elements. Assignment should be distributed by the class teacher at the beginning of the session and to be submitted at the end of the session.	3
B. Design using standard soft-wares like Proengineer, Solid Works, CATIA.	3

CONVECTION AND MASS TRANSFER (ME 313)

3 credit, 3 periods/week

	No. of Lectures
Theory	
Convection: Introduction. Different types of flow. Newton's law of cooling and significance of heat transfer coefficient. Different types of convection. Enhancement of convection. Boundary layer concepts. Causes and effects of boundary layers.	3
Forced Convection: Laminar flow over a flat plate. Momentum, energy and integral equation in two-dimensions. Non-dimensionalisation and significance of non-dimensional quantities. local and average heat transfer coefficients; forced convection for turbulent flow over a flat plate; forced convection inside tubes and ducts; forced convection across cylinders and spheres. Flow across tube banks. Correlations-forced convection for external and internal flows.	15
Natural Convection: Mechanism of natural convection. Grashof's number and its significance. Natural convection from horizontal, vertical and inclined plates and cylinders.	4
Heat Transfer With Change of Phase: Condensation, types of condensation; condensation over flat surfaces, inside and outside tubes. Boiling, types of boiling, boiling curve, heat transfer in boiling, heat pipe.	7
Heat Exchanger: Basic types of heat exchanger, LMTD, heat exchanger efficiency, fouling and scaling of exchanger surface, NTU method of heat exchanger design, applications of heat exchangers based on counter, parallel and cross flow.	6
Mass Transfer: Fick's law of diffusion, Mechanism of mass transfer. Mass transfer coefficient, evaporation of moisture from wetted surfaces to surrounding gases. Dimensionless parameters related to mass transfer.	4

CONVECTION AND MASS TRANSFER (ME314)

0.75 credit, 3/2 periods/week

	Weeks
Sessional	6
1. Experiment on tube side heat transfer.	
2. Experiment on water to water heat exchanger.	
3. Experiment on air to water heat exchanger.	
4. Experiment on free and forced convection heat transfer.	
5. Experiment on boiling heat transfer.	

ENGINEERING METALLURGY (ME351)

3 credit, 3 periods/week

	No. of Lectures
Theory	
Crystal Structure of Metals and Alloys: Types of crystal lattices, Stereographic projection, Experimental Tools & Techniques: Optical microscopy, X-Ray Diffraction (XRD), Transmission electron microscopy (TEM), Scanning electron microscopy (SEM), solidification as process of crystallization and grain growth, crystal defects, dislocation and Strengthening Mechanisms.	6
Phase diagrams: Cooling curves, phase diagrams, iron-carbon alloys. Iron-iron carbide equilibrium diagram, plain carbon steel and their micro-structure**.**	8
Heat Treatment of Steel: Types of heat treatment, normalizing, annealing, hardening, tempering, austempering. TTT diagram and different types of case hardening processes.	7
Iron and Steel: Pig iron manufacturing, properties and uses, wrought iron manufacturing, properties and uses.	2
Steel and its alloys: Manufacturing of steel, properties and uses of steel, different types of alloy steels, specification of steel, characteristics of tool steel, stainless steel and heat resisting steel.	4
Cast Iron: Cast iron manufacturing, properties and uses. Different types of cast iron, their properties and uses, alloys of cast iron.	3
Non Ferrous Metals and Alloys: Composition, properties and uses of copper, Zinc, Aluminum, Nickel, Tin, white metal etc.	3
Powder Metallurgy: Introduction, powder metallurgy processes, preparation of metal powders, characteristics, mixing, compacting, sintering, application.	2
Composite materials: Introduction to composite materials, importance of composite materials and uses.	2
Material science: latest development in materials science, electrical, magnetic and thermal properties of materials.	2

ENGINEERING METALLURGY (ME352) 0.75 credit, 3/2 periods/week	Weeks
Sessional Properties of metals and alloys; study of microstructures of metals and alloys; volumetric analysis of metals and alloys, making a heat treated steel and study of properties and microstructure of heat treated steel.	6

MECHANICAL ENGINEERING
B. Sc. ENGINEERING LEVEL-4 (TERM-I)

Sl. No.	Course No.	Course Title	Contact hour/week	Credits
THEORY				
1	ME413	Power Plant Engineering	3	3
2	ME461	Production and Operations Management	4	4
3	ME451	Machine Tools and Tool Engineering	4	4
4	ME431	Machine Design–II	3	3
5	ME417	Refrigeration and Air-conditioning	3	3
SESSIONAL/LABORATORY				
6	ME452	Machine Tools and Tool Engineering	3/2	0.75
7	ME432	Machine Design–II	3/2	0.75
8	ME492	Industrial Training **	3 weeks in industry	1.5
9	ME494	Project and Thesis	3/2	0.75
			21.5	20.75

Contact Hours: 17 (Theo) + 4.5 (Lab) = 21.5 hours/week
No. of Theory Courses = 05
Total Credits = 20.75
No. of Laboratory Courses =04
** This will be done at an appropriate time within the Level.

COURSE CONTENT

POWER PLANT ENGINEERING (ME413) 3 credit, 3 periods/week	No. of Lectures
Power Plants: Types of power plants, loads and load curves, variable load problems, power plant economy, capital and operating cost of power plants, performance and operating characteristics of power plant, Tariff for electric energy.	4
Steam Power Plants: General layout; Gas loop: draft system, fan selection, economizer and air preheater. Water loop: modern steam generators, feed water treatment, superheater, desuperheater^{+} and reheater, condenser, surface condenser calculations, closed and open feed water heaters, deaerator, evaporator. Regeneration and direct contact feed water heaters, calculation of efficiency and heat rate, extraction performance, super critical cycle, types of coal and their characteristics, coal analysis, fuel and ash handling systems, combustion equipment for burning coal with a special emphasis to coal feeders & coal mills, mechanisms of pulverized coal combustion, pollution control technologies, superposed and binary cycle, cogeneration, gas and steam turbine combined cycles. Circulating water system, use of cooling tower and spray pond.	16
Steam Turbine: Impulse and reaction turbines, flow in steam nozzles, nozzle types, flow area of nozzle, super saturated flow. Description of main components i.e. turbine casing, rotor, blades, steam admission valves, couplings, bearing, barring gear. Compounding of turbine, power and efficiency calculations, turbine losses, condition line and reheat factor; turbine arrangement, installation and operation. Metallurgical consideration; Methods of attachment of blades to turbine rotor. Turbine gland sealing system.	6
Hydroelectric Power Plants: Classification, advantages and disadvantages, site selection criteria, hydrological cycles, essential elements of hydroelectric power plant, layout and installation, selection of water turbines, principles of operation and governing.	2
Nuclear Power Plants: Field of use, atomic nuclei, atomic number and mass number, isotopes, atomic mass unit, energy from nuclear fission and fusion, neutron energy, nuclear cross-section, neutron flux, initiation of nuclear reaction, components of nuclear reactor, nuclear fuel, fertile materials, moderation and moderating materials, coolant, cladding and structural materials, reflecting materials, control rod materials, shielding materials, types of nuclear reactors, pressurized water reactor, boiling water reactor, gas cooled reactor, fast breeder reactor, reactor containment design, control systems, radiation hazards, waste disposal and safety requirement. Location of nuclear power plant.	6
Electrical Power Transmission: Basic concepts, types of transmission and distribution systems, instrumentation in power plants.	1
Solar Energy: Availability of solar energy, solar devices, solar concentrators and tracking, direct production of electricity, solar thermal energy conservation system, dish and parabolic trough concentrating generating systems, central tower solar thermal power plant, primary coolant. Thermal storage. Solar pond	3

Wind Mills: Types, wind characteristics and site selection, wind power, forces on blades, operation, and new developments.	1

PRODUCTION AND OPERATIONS MANAGEMENT (ME461) 4 credit, 4 periods/week	**No. of Lectures**
Introduction: Concept of production and operation systems, factors of production, types of production, production planning and control and its functions, relationship with other management activities.	2
Production-Line Balancing: Concept, development of a balanced production line.	2
Re-engineering and Reverse Engineering: Fundamental concepts. Impacts and impotence of Re- engineering and Reverse Engineering.	2
Ergonomics: Importance and impact on production, man-machine system, ergonomic design and related factors.	1
Resource Scheduling: Objectives, introduction to aggregate planning and master production schedule (MPS), scheduling and sequencing, Gantt chart, scheduling of n jobs to m machines.	4
Linear programming: Mathematical formulation, graphical solution, general simplex method and its relation with graphical solution.	3
Transportation model: Cases of balanced and unbalanced supply demand conditions, solution network.	3
Location and Layout: Factors of plant location, types of plant layout, layout design	2
Material Handling: Classification of material handling systems, selection of material handling equipment.	2
Supply Chain and Inventory Management: Concept of supply chain management, development of supply chain, managing the flow of materials across the supply chain.	4
Types of inventory, inventory control, classification of stocks, inventory models under certainty, EOQ/ EPQ and recorder point, quantity discount,	4

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out of stock, inventory control of dependent and independent items.	4
Material requirement planning (MRP), MRP-II, JIT production, inventory record keeping.	
Network Analysis: CPM, determination of critical path, completion time of the project and determination of minimum number of workers, concept of schedule crushing and difference with PERT.	5
Method Analysis and Work Measurement: Process analysis, process charts, multiple activity charts, man-machine charts, operation analysis, operator process chart; principles of motion economy	3
Work measurement-determination of standard time, time study, determination of efficiency and allowance factor, work sampling.	3
Forecasting Purpose and factors of forecasting, methods of forecasting, qualitative and quantitative forecasting methods and their application. Time series analysis, moving average, smoothing techniques, trend analysis and tracking signal, regression analysis and correlation. Seasonal forecasting.	3
Productivity Analysis and Improvement: Productivity types, productivity cycles, analysis and improvement methods, productivity improvement models	2
Introduction to value engineering and process optimization	2
Computerized production planning and control system.	1

MACHINE TOOLS AND TOOL ENGINEERING (ME451) 4 credit, 4 periods/week	**No. of Lectures**
Theory **Machine Tool** Classification, specification of different machine tools, description of turret and copying lathe, Universal milling machine, jig boring machine, honing machine, hobbing machine.	2
Kinematic Structure of Machine Tools: Developing the kinematic chain of machine tools, determination of transmission ratio, drawing of ray diagrams, analysis of kinematic structure. Analysis of G.P. series.	8
Drive Systems: Mechanical, hydraulic, electrical and pneumatic drive systems, speed and feed gear boxes, optimum speed, gearbox design, basic principles of cluster gear design, step-less drives, control systems in machine tools.	8

Modern Machining Techniques: Transfer line, numerical control of machine tools-fundamental concepts, main components of NC machine tools, types of NC machines- machining center, introduction of part programming, introduction of CNC and DNC, fundamentals of CAM, application of group technology and introduction to flexible manufacturing system.	9
Robotics: Introduction to robotics, basic components of robot technology levels, manipulator features arm geometry, rotation, drive system, work envelopes, mounting, internal components of controllers, general features, input power, master control memory.	7
Machine Installation and Testing: Installation procedure, foundation design. Trends in the development of modern machine tools. Testing after installation.	2
Tool Engineering **Work Holding Devices**: Degrees of freedom, principles of location, locating methods, locators, clamping devices and forces; types, design and detailed study of jigs and fixtures used in various machining processes.	8
Die Design: Dies and punches, introduction to die cutting operations, die clearance, piercing and blanking die design; cutting by punches; strip layout, bending, forming and drawing dies, drawing forces, blank size determination.	7

MACHINE TOOLS AND TOOL ENGINEERING (ME452) 0.75 credit, 3/2 periods/week	Weeks 6
Sessional Design of a speed gearbox. Study of different work and tool holders, jigs and fixtures, design and manufacture of simple dies, strip layout and blank size determination problems, use of machine tools to make mechanical parts.	

MACHINE DESIGN-II (ME431) 3 credit, 3 periods/week	**No. of Lectures**
Theory **Shaft Design**: Design for fully reverse banding and steady torsion. Design for fluctuating banding and fluctuating torsion. Shaft deflection.	5
Key and Keyways: Types of keys, stresses in keys, key design, stress concentration in keyways.	3
Design of sliding contact bearing.	3
Design of antifriction (ball and roller) bearing.	5
Design of spur gears (loading and stresses).	4
Design of helical, bevel and worm gears.	6
Belt (flat, v-belt, vv belt), chain (single and multi-strand) and rope drives.	6
Brake and clutches.	4
Gaskets and gasket joints.	1
Oil seal: Construction and mounting.	1
Coupling: Rigid couplings, compliant couplings.	1

MACHINE DESIGN-II (ME432) 0.75 credit, 3/2 periods/week	Weeks 6
Sessional a. Design and check problems based on ME431. b. **Individual Design Project Assignment:** Students should design a complete mechanism of a machine with the design of relevant elements. Assignment should be distributed by the class teacher at the beginning of the session and to be submitted at the end of the session. c. Laboratory works.	

REFRIGERATION AND AIR CONDITIONING (ME417) 3 credit, 3 periods/week	**No. of Lectures**
Refrigeration **Introduction**: Applications of refrigeration. Method of producing refrigeration. Steady-flow energy equation. Car not cycle and reversed Car not cycle. Coefficient of performance. **Vapor Compression Refrigeration Systems**: Simple vapor compression refrigeration cycle. P-H and T-S diagrams. Actual cycle and its analysis. Volumetric efficiency of reciprocating compressors. Study of compressor, condenser, expansion device and evaporator used in a	19

refrigeration system.

Refrigerants: Classification and designation of refrigerants. Primary and secondary refrigerants. Azeotropes. Desirable properties of refrigerants. Applications of specific refrigerants. Thermodynamic comparison of some common refrigerants.

Multi-pressure Refrigeration Systems: Applications. Removal of flash vapor. Inter-cooling. Analysis of few multi-pressure systems.

Absorption Refrigeration: Simple and practical absorption refrigeration systems. Coefficient of performance. Absorbent-refrigerant combinations. Comparison of vapor-compression and absorption refrigeration system. Electrolux and commercial system of refrigeration.

Air-Cycle Refrigeration: Applications. Closed and open air-cycles. Simple cycle and Bootstrap cycle for aircraft air conditioning.

Steam-Jet Refrigeration: Applications. Description and working principles of the system.

Low Temperature Refrigeration: Vapor compressor - Cascade system, Liquefaction of gas – Air, Helium and natural gas.

Manufacturing Dry Ice: Carbon dioxide, magnetic cooling. Heat pump: refrigerant circuit, performance of heat pump, application of heat pump.

Solar absorption refrigeration, vortex tube refrigeration, thermoelectric refrigeration.

Air Conditioning

Application of air-conditioning.

Psychrometrics: Properties of air and water-vapor mixture. Psychrometric chart and its construction. Various psychrometric processes. Psychrometers. Combined heat and mass transfer between a wetted surface and moist air.

Air Conditioning Load Calculations: Thermal comfort. Comfort chart. Inside and outside design conditions. Heat transmission coefficients for building structures. Heating and cooling load items and their calculations. Determination of dehumidified air quantity. Selection of cooling and dehumidifying coils. Selection and specifications of an air conditioning equipments. Basic types of air conditioning systems.

Conditioned Air Distribution Systems: Duct types, materials and constructions. Duct layout and design. Fan selection.

Chilled/Hot Water Distribution Systems: Direct and reversed systems. Pipe layout and design. Pump selection.

Refrigeration and Air Conditioning Controls: Reasons for use of controls in refrigeration and air conditioning systems. Pneumatic, hydraulic, electric and electronic controls.

Design of air conditioning system.

Introduction to Food Preservation: Chilling, freezing, and free-drying.

Food Processing and Preservation: candy manufacture, bakery products, fruits and vegetables.

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PROJECT AND THESIS (ME494) 0.75 credit, 1.5 periods/week Experimental and theoretical investigation of various problems related to Mechanical engineering. The topic should provide an opportunity to the student in developing initiative, creative ability and engineering judgment. Individual or group study (preferably not more than two in a group) will be required. At the end of Term, the student is expected to complete the preliminary literature survey, select the topic for study, complete theoretical study on the topic and submit a detailed report for evaluation.	

MECHANICAL ENGINEERING
B. Sc. ENGINEERING LEVEL-4 (TERM-II)

Sl. No.	Course No.	Course Title	Contact hour/week	Credits
		THEORY		
1	ME411	Applied Thermodynamics	3	3
2	ME421	Fluid Machinery	3	3
3	ME463	Industrial Management	4	4
4	ME455	Mechatronics	3	3
5	ME4**	Optional	3	3
		SESSIONAL/LABORATORY		
6	ME412	Applied Thermodynamics	3/2	0.75
7	ME422	Fluid Machinery	3/2	0.75
8	ME456	Mechatronics	3/2	0.75
9	ME498	Project and Thesis	9/2	2.25
			25.0	20.50

Contact Hours: 16 (Theo.) + 9.0 (Lab.) = 25.0 hours/week
No. of Theory Courses = 05
Total Credits = 20.50
No. of Laboratory Courses =04

Optional Subject: (ME4)**

ME415 Automobile Engineering	ME437 Fracture Mechanics	ME465 Engineering Economy
ME419 Petroleum Engineering	ME439 Composite Materials	ME469 Operations Research
ME423	ME453 Plastics Process	ME471 Textile

Aerodynamics ME425 Gas Dynamics ME427 Fluidics ME429 Design of fluid Machines ME433 Stability of Structures ME435 Noise and Vibration	Technology ME457 Robotics ME459 Computer Integrated Manufacturing	Engineering ME483 Renewable Energy Technology ME491 Safety Engineering and Emergency Planning

COURSE CONTENT

APPLIED THERMODYNAMICS (ME411) 3 credit, 3 periods/week	**No. of Lectures**
Theory **Internal Combustion Engines**: Classification. Basic engine nomenclature. ICE fuels. Testing and performance of I.C. engines. Fuel-air cycle and real cycle analysis, variation of specific heats. Use of combustion charts; Combustion phenomena in S.I. and C.I. engines. Flame propagation during combustion, knocking in I.C. engines and its effects on engine performance, factors affecting knocking, methods to reduce knock. Octane and cetane ratings of fuels. Combustion chamber design of I.C. engine. Fuel Injection system in compression ignition engine, fuel spray behavior, heat release pattern. Carburator and elctronic fuel injection systems in spark ignition engine. Volumetric efficiency of I.C. engines factors affecting volumetric efficiency. Heat transfer in I.C. engines. Two-stroke engines, scavenging, scavenging efficiency. Supercharging. Exhaust emission from I.C. engine. Euronorms I & II. Alternate fuels for I.C. engines. Advanced engines.	25
Gas Power Cycle: Brayton cycle. Open gas turbine cycle. Gas turbine components; Multistage compression and multistage expansion in gas turbines. Power and efficiency calculations, optimum pressure ratio. Improvements of Brayton cycle: regeneration, inter cooling, reheating, water injection. Comparison between ideal and real cycles. Turbine blade materials. Cooling of turbine blades, film cooling, impingement cooling, cooling design	6
Thrust Propulsion: Basic propulsion systems: Propeller, turbojet, rocket, turbo propeller, turbofan, and ramjet engines and their performance. Thrust augmentation. Efficiency, power and other performance criteria. Rocket propulsion: rocket equation, gravity loss, optimum acceleration, rocket staging, orbital mechanics, rocket engines, rocket casing design, propellants, flow of reacting gases. Pulsejet engines.	5
Direct Energy Conversion: Fuel cells, thermoelectric converters, thermionic devices, magneto-hydrodynamic (MHD) power generators, photo-voltaic cells, and plasma engines. Study of advantages and limitations of the above devices.	3

APPLIED THERMODYNAMICS (ME412) 0.75 credit, 3/2 periods/week	
Sessional Study of petrol, diesel Engine and gas turbine, performance tests of petrol, diesel and gas turbine including drawing of indicator diagram. Determination of rating of petroleum fuel. Heat balance of IC engine. Study of boiler and thermal power plant and determination of boiler efficiency and overall plant efficiencies.	

FLUID MACHINERY (ME421) 3 credit, 3 periods/week	**No. of Lectures**
Theory **Introduction:** Rotodynamic and positive displacement machines, Euler's pump turbine equation. Fluid coupling and torque converter.	3
Fluid Machinery: Introduction to fluid power; properties of hydraulic fluids, components, applications; Energy and power in hydraulic systems; hydraulic valves.	3
Turbines: Impulse and reaction turbine classification, performance of Pelton wheel, Francis turbine and Kaplan turbine, characteristic curves, governing of turbines, selections and model test of turbine.	12
Pumps: Work done and efficiency of centrifugal pumps, advantage over reciprocating pumps, types of centrifugal pumps, minimum starting speed, least diameter of impeller, limitation of suction lift, characteristics curves. Priming, troubles and remedies, specific speed and model testing. Pumps in series and in parallel, deep tube well, multistage pumps, turbine pump, selection of pumps, and introduction to Impeller design. Working principle of reciprocating pump, types of reciprocating pumps, work done by reciprocating pump, co-efficient of discharge, slip, cavitation of reciprocating pumps, effect of acceleration of piston on velocity and pressure in the suction and delivery pipes, indicator diagrams; effect of air vessels on suction and delivery line	12

Other Fluid Machinery: Reciprocating gear and screw pumps, fans, blowers and compressors, Hydraulic transmission: fluid coupling and torque converter.	6
Introduction to fluid power: Properties of hydraulic fluids, components, applications; Energy and power in hydraulic systems; hydraulic valves.	3

FLUID MACHINERY (ME422) 0.75 credit, 3/2 periods/week	Weeks
Sessional Experiment on the performance test of 1. Pumps (Centrifugal, reciprocating, and axial flow pump). 2. Turbine (pelton wheel, Kaplan, Francies). 3. Nozzles.	6

INDUSTRIAL MANAGEMENT (ME463) 4 credit, 4 periods/week	**No. of Lectures**
Management Fundamentals: Scope, function and role of management, management and administration, role of manager.	2
Development of Management Thoughts: Taylor's scientific management theory, contribution of H. Fayol, E. Mayo, Gilbreths and other pioneers, classical management theory, principles of management.	3
Planning and Decision Making: Strategic management, planning process and organizational goal: MBO-nature and purpose, MBO process and effectiveness. Managerial decision making: the nature of decision making and decision making process. Portfolio analysis: SWOT, BCG, SPACE etc	5
Organization: Fundamentals, organization variables, organization structure; types, span of control, authority, responsibility and accountability, centralization and decentralization, organization culture, reorganizing, organization development.	5
Personnel and Human Resources Management: Functions, personnel policies, manpower planning, recruitment and development.	2
Leading and motivating: types of leadership and styles, theory of leadership, morale and motivation, motivation theories and morale building plans, individual and group behavior, job enlargement and enrichment.	5
Performance appraisal/ merit rating, job evaluation, salary, wages and wage incentive plans, fringe benefits.	2
Marketing: concepts of marketing mix, product life cycle, marketing decision making, industrial and consumer selling, channel of distributions, sales promotion, patent and trade mark. Marketing research, development of new product.	3
Management Ethics: Social and ethical responsibility of managers.	1
Management Information System: MIS application of computer in management and decision making (DSS).	2
Global Management: Comparison of management systems of USA, Japan and China.	1
Financial Management: Financial analysis, ratio analysis, different types of ratios and their uses, limitations and trend analysis, time value of money, decision making based on PW, EUAW, B/C ratio, break even analysis, value engineering.	16
Safety Management and Emergency Planning: Preventive and break down maintenance, occupational safety, fire and explosion hazards, industrial safety, electrical hazards.	4
Technology Management: Importance, elements of technology management, related factors for effective technology management	1

MECHATRONICS (ME455) 3 credit, 3 periods/week	No. of Lectures
Theory	
Introduction: Introduction to Mechatronics systems, Mechatronics system components - Measurement Systems, Control Systems - Open and Closed Loops Systems, Sequential Controllers with examples – Water level controller, Shaft speed control, Washing machine control, Automatic camera and Engine management systems	5
Sensors and monitoring: Introduction to sensors and transducers, sensor characteristics, classification of sensor. Sensors for displacement, position, proximity, velocity, motion, force. Torque and tactile sensors. Pressure, temperature, light sensors. Ultrasonic sensors; range sensors.	7
Actuation Systems and PLC: Linear and rotary actuators. AC and DC motors, stepper motor, servo motor. Fluid power actuators, smart actuators. Introduction to PLC, basic structure, input/output processing; PLC programming, Programming the PLC using Ladder diagram **-** Simple example of PLC applications	10
System Modeling and Representation: Introduction to test signals, systems and controls. System representation: Transfer function form, block diagram form. Linearization of nonlinear systems; time delays; measurement of system performances. Modeling of mechanical, electrical, fluid and thermal systems. Rotational-transnational systems, electromechanical systems, state-space modeling	9
Mechatronics system design and applications: Stages in designing Mechatronics Systems, Traditional and Mechatronics Design, classical design, frequency response analysis, root locus, bode plots, Proportional-integral-derivative (PID) control, digital control, AI in mechatronics, case studies of mechatronics system	8
MECHATRONICS (ME456) 0.75 credit, 3/2 periods/week	Weeks
Sessional Introduction to control system toolbox in MATLAB; system modeling and control with MATLAB/Simulink; intelligent control; PLC programming; interfacing with PC; data acquisition.	6

AUTOMOBILE ENGINEERING (ME415) 3 credit, 3 periods/week	No. of Lectures
Introduction: General classification of motor vehicles, layout and main components, specification of an automobile. Performance of an automobile, calculation of total loads, tructive effort and propulsive power.	4
Chassis: Frame and body, suspension system, springs, wheels and tires.	4
Engine: Types, comparison, rating and specification, constructional details of automobile engine, engine mounting, *Hybrid car, Electric car,* exhaust system, emission control.	5
Transmission: Clutch, gear box, propeller shaft, universal joint, final drive, differential, rear axle and front axle, over drive, under drive.	6
Automobile Control System: Steering system, brakes and braking system, speed control and governing. Automatic control system. Advanced Vehicle Control and Safety	5
Automobile Electrical System: Battery and its maintenance, battery charging, generator and charging system, the cutout starting system, Bendix drive and Solenoid drive, self-starter, lighting and wiring system.	4
Ignition System: Components, ignition timing and ignition advance, magnetos, carburetion and fuel injection system, firing order.	3
Repair and Maintenance: Servicing, tuning, overhauling, inspection and testing, trouble shooting, safety measures.	2
Recent Advancement in Automobiles: **Recent Advancement in Automobiles**: EFI system, variable valve timing, automatic clutch and gear-change, electronic control unit (ECU), Engine Sensors, TCU(Telematics Control Unit)	4
C. **N. G.**: Conversion of petrol and diesel engines to CNG vehicles.	2

PETROLEUM ENGINEERING (ME419) 3 credit, 3 periods/week	**No. of Lectures**
An overview of hydrocarbon reserves in Bangladesh.	3
Classification of rocks, hydrocarbon deposits, and their genesis.	4
Geophysical Exploration of Oil and Gas: Origin, accumulation, composition and behavior of hydrocarbon reserves.	10
Analysis and prediction of reservoir performance.	3
Drilling rigs and their types.	3
Rig moving equipment, rig components and their auxiliaries.	3
Drilling operations: Vertical and direction drilling.	3
Well logging and interpretation.	3
Cracking and steaming.	3
Well completion and cementation.	3

AERODYNAMICS (ME423) 3 credit, 3 periods/week	**No. of Lectures**
Inviscid incompressible flow to include potential function, stream function, circulation and basic flows, Kutta-Joukowski theorem; Aerofoil theory and wing theory.	12
Drag aircraft, propulsion and propeller; static performance problem, special performance problem. Introduction to stability and control; Longitudinal stability and control; Lateral and directional stability and control.	26

ENGINEERING ECONOMY (ME465) 3 credit, 3 periods/week	**No. of Lectures**
Capital Investment: Cash flow diagram, interest-simple and compound, discrete cash flow, continuous cash flow, present worth, future worth, uniform annual series payment, gradient cash flow, rate of return of single and multiple alternatives, MARR, effect of inflation, capital investment criteria, pay back. Replacement analysis, bonds, after tax economics analysis.	10
Public Sector Economics: Capitalized costs, benefit-cost ratio. Capital recovery and decision-making.	8

Depreciation: Methods to calculate depreciation, switching between methods, depletion, appreciation, amortization, economic life, project evaluation.	8
Cost-volume-profit Analysis: Identification of different type of costs, break-even analysis, marginal cost and margin of safety, analysis for single and multi-product.	9
Sensitivity analysis and decision trees, decision making for large capital investment.	3

OPERATIONS RESEARCH (ME469) 3 credit, 3 periods/week	**No. of Lectures**
Introduction: Modeling, assumptions, scope and limitation of O.R. models.	1
Linear Programming: Mathematical formulation; maximization and minimization. Simplex method: general, big-M method, dual SIMPLEX method, degeneracy, duality, interpretation of the dual problem, Revised simplex method, sensitivity analysis.	10
Transportation Problems: Cases of balanced and unbalanced supply demand conditions, North-West corner rule, VAM, Finding optimal solutions.	2
Integer Programming: Branch and bound algorithm, cutting plane algorithm.	4
Waiting Line Models: Application areas; Poisson arrival and exponential services. Analysis of single-server cases, simple multiple-server cases, exact solution, approximation methods for general queuing problems.	6
Markov Chain and its application, traveling salesmen problem.	3
Decision Analysis: Risk and uncertainty, criteria for decisions under risk, decision trees, criteria for decisions under uncertainty, game theory.	5
Dynamic programming for deterministic models, simulation, application to queuing systems. Introduction to NLP (non-liner programming): Types of NLP, solutions of nonlinear equations. Lagrangian method. Khun – Tucker method.	7

PROJECT AND THESIS (ME498) 2.25 credit, 4.5 periods/week	
Experimental and theoretical investigation of various problems related to Mechanical engineering. The topic should provide an opportunity to the student in developing initiative, creative ability and engineering judgment. Individual or group study (preferably not more than two in a group) will be required. A thesis will have to be submitted on the project at the end of Term.	