MALAWI UNIVERSITY OF SCIENCE AND TECHNOLOGY

CALL FOR APPLICATIONS FOR 2022/23 POSTGRADUATE PROGRAMMES AND SHORT COURSES

A. Postgraduate Programmes

1, MSc in Biodiversity Informatics

The programme aims to equip students with skills in mobilizing, managing, publishing and using biodiversity data to inform decision making processes in conservation, agriculture, water resource management, spatial planning and health. It is offered on a full time basis, with course work covered in the first year and dedicated research leading to an MSc thesis in the second year.

Admission requirements

Candidates must have the following:

a. A Bachelor's degree from any recognized and accredited university in a relevant field

b. Evidence of practical and relevant experience in related fields for those with degrees in other fields

2, MEng in Biomedical Engineering

Master of Engineering in Biomedical Engineering is a two-year engineering programme offered over four semesters. In the first year, students learn different modules and carry out one research project using a combination of face-to-face and virtual lectures. The lectures are offered on a full-time basis during which the candidates are periodically taught and allocated time to work on assignments after classes. During the second year, candidates carry out a medical research project and attend biomedical engineering seminars.

Admission requirements

- Applicants should have a first degree from an accredited university in either Biomedical Engineering, Electrical Engineering, Mechanical Engineering, Medicine, Biomedical Sciences or Life Sciences.
- Any other BSc or BEng qualifications in relevant Engineering, Medicine, and Life Science fields.

Application process

To be considered, applicants must submit the following mandatory requirements:

i. A completed postgraduate application form available at MUST Registry or on MUST website (www.must.ac.mw), under Media Centre, then Downloads);

ii. A motivational statement (2 pages maximum);

iii. Curriculum Vitae ;

iv. Certified copies of academic certificates;

v. Certified copies of academic transcripts;

vi. Proof of funding, for example sponsorship letter or copies of appropriate financial records for self-sponsored students or letter of undertaking to pay the required fees from the applicants or their parent/guardian or sponsor with evidence of reliable source of income;

vii. Two reference letters (one academic and one professional); and

viii. An original bank deposit slip/proof of payment of a non-refundable application fee of MK10,000 for Malawians and SADC nationals and US$50 for all other international students. Payment of application fees must be paid online through the MUST website or at the following bank account:

Bank Name:	Standard Bank
Branch:	Limbe
Account Name:	MUST Students Account
Type of Account:	Current Account
Account Number:	9100001063429
Swift Code:	SBICMWMX

Fees for the programmes

Tuition fees for both programmes are US$5000 or Malawi Kwacha equivalent per academic year. One full scholarship is available for a SADC applicant and limited tuition scholarships available for applicants from Malawi for the MSc Biodiversity Informatics programme.

Submission for Applications

The deadline for receiving completed applications is Monday, 13 March, 2023.

For enquiries, please email: n-s-c-e-s@must.ac.mw with a copy to biodiversity@must.ac.mw; Or call +265 1478279/ +265 1478000.

Completed application forms should be sent to:

The University Registrar

Malawi University of Science and Technology

P.O. Box 5196,

Limbe

MALAWI

Email: admissions@must.ac.mw; copy: research@must.ac.mw and
biodiversity@must.ac.mw

B. Short Courses

1, AutoCAD 2D

AutoCAD is a computer-aided design (CAD) software application used to create 2D and 3D designs, maps, and technical drawings. It is widely used in various industries such as architecture, engineering, and construction. With the rise of digitalization, it is becoming increasingly important to have a good understanding of CAD software. Our AutoCAD 2D short course is designed to provide you with a comprehensive understanding of AutoCAD 2D and its various applications.

Key features of the course

- In-depth coverage of 2D design concepts and tools in AutoCAD
- Practical hands-on experience with real-life projects
- Friendly and interactive learning environment with experienced instructors
- Completion certificate at the end of the course

Duration: 8 weeks with 4 hours of class per week and an assessment every Friday.

Eligibility: Basic knowledge of computer and drafting is desirable

Fresh graduates, students, and working professionals who want to learn AutoCAD 2D are eligible

Outcome: By the end of the course, you will be able to:

- Create and edit 2D drawings and designs in AutoCAD
- Utilize various tools and techniques in AutoCAD to produce high-quality drawings

- Develop basic understanding of AutoCAD's interface, commands, and options
- Apply the concepts learned in real-life situations

Fee: K320,000.00

Location: MUST campus but will employ a blended approach i.e face-to-face and online.

2, AutoCAD 3D Short Course

Looking to improve your design skills and advance your career in the engineering, architecture, or construction fields? Whether you're a beginner or an experienced user looking to brush up on your AutoCAD 3D skills, our short course is the perfect solution for you. In this comprehensive course, you will learn how to create accurate and realistic 3D models, use advanced 3D tools and techniques, and become proficient in all the latest features of AutoCAD 3D. You will gain hands-on experience working with a variety of design and visualization tools and techniques, and will come away with a deep understanding of the software and its many uses.

What You Will Learn:
- Introduction to AutoCAD 3D
- 3D modeling techniques and best practices
- 3D visualization tools and techniques
- Advanced 3D features, such as materials, lighting, and rendering
- Effective use of AutoCAD 3D in the design and construction process

Benefits of the Course:
- Enhance your design skills and expertise
- Learn how to create accurate and realistic 3D models
- Gain a competitive edge in your field
- Boost your resume and job prospects

Eligibility and Requirements

- Basic knowledge of 2D design
- Laptop or desktop computer
- Internet connection

Duration: The course is designed to be completed in 8 weeks. Each week consists of 4 hours of class and an assessment every Friday. This flexible schedule allows you to balance your work and other commitments while still advancing your skills and knowledge.

Fees: K350,000.00

3, Autodesk Revit Architecture Fundamentals Short Course

Autodesk Revit is a powerful software tool that is widely used by architects, engineers, and construction professionals for building information modeling (BIM). In this course, you will learn the fundamental skills and knowledge needed to effectively use Autodesk Revit Architecture software. You will learn how to create and modify building components, such as walls, doors, windows, and roofs, as well as how to work with annotations, dimensions, and schedules. By the end of this course, you will have a solid understanding of the software and be able to use it effectively to design, document, and collaborate on your building projects.

Outline:

- Introduction to the Autodesk Revit Architecture interface and work environment
- Basic concepts of building information modeling (BIM) and how to use Revit for BIM projects
- Creating, manipulating, and organizing building components, such as walls, doors, windows, and roofs
- Using Revit's annotation and dimensioning tools to create construction documents and details
- Using Revit's 3D modeling tools to visualize and explore your building design
- Understanding how to use Revit's collaboration tools to work with other team members on your projects
- How to use Revit to manage data and information throughout the building design and construction process

Duration: 12 weeks.

Prerequisites: Basic knowledge of architecture and design is recommended. No prior experience with Autodesk Revit Architecture or other design software is required.

Location: MUST campus but will employ a blended approach.

Target groups:

- Architects and architectural professionals who are new to Autodesk Revit
- Engineers, contractors, and other construction professionals who want to learn how to use Revit for building information modeling
- Design professionals who are looking to expand their software skills and work more efficiently on building projects

Fee: K500,000.00.

4, Computer-Aided Design/Computer-Aided Manufacturing and Computer-Aided Engineering Integrated with Fusion 360

MUST is proud to present a short course that will take you from beginner to expert in the field of CAD/CAM and CAE integrated with Fusion 360. The course is designed for individuals who are seeking to enhance their skills and knowledge in the field of computer-aided design, manufacturing, and engineering.

With the increasing demand for skilled professionals in the field of CAD/CAM and CAE, this course is a perfect opportunity for individuals who are seeking to expand their skills and knowledge in the field. The short course is designed to equip you with the latest technology in the field of CAD/CAM/CAE and Fusion 360. You will learn how to use advanced tools and techniques to create, analyze and manufacture your designs with ease.

Fusion 360 is a cloud-based platform that offers a comprehensive suite of tools for product development. It integrates computer-aided design, manufacturing, and

engineering into one platform, making it a versatile tool for professionals in a variety of industries.

Key Features:

- Hands-on training in the use of Fusion 360 for CAD/CAM and CAE.
- A comprehensive overview of the basics of computer-aided design, manufacturing, and engineering.
- Learn how to use Fusion 360 for product development, from design to prototyping and production.
- Learn how to integrate computer-aided design, manufacturing, and engineering into a single platform.
- Get familiar with the Fusion 360 interface and its various tools and features.

Benefits:

- Expand your skills and knowledge in the field of computer-aided design, manufacturing, and engineering.
- Get hands-on experience using the latest software and technology in the field.
- Improved design accuracy
- Increased design efficiency
- Enhanced creativity and innovation

Course Outline:

- Introduction to CAD/CAM/CAE
- Fundamentals of Fusion 360
- Design and modeling techniques
- Simulation and analysis
- CAM and CNC programming
- Final project and presentation

Duration: 12 weeks but it will use a blended learning approach. Each week consists of 4 hours of online class and an assessment every Friday. This flexible schedule allows

you to balance your work and other commitments while still advancing your skills and knowledge.

Fee: K550,000.00

Eligibility and Requirements

- Basic knowledge of design and engineering
- Laptop or desktop computer
- Internet connection

The course is ideal for professionals in mechanical engineering, product design, and manufacturing. It is also a great opportunity for individuals who are looking to expand their skills and knowledge in the field of computer-aided design, manufacturing, and engineering.

5, SolidWorks

The course designed to help you unlock the full potential of SolidWorks. Students will be guided through the basics of 2D sketching, part modelling, reference geometry, and the basics of assembly. If you're a beginner or looking to expand your knowledge, the course will provide you with the tools and techniques you need to become a confident SolidWorks user.

Outline:

By the end of the course, you will have a solid foundation in SolidWorks and be able to use the software to create and modify your own designs. Our experienced trainers will be available to support you every step of the way, ensuring that you get the most out of your learning experience.

Outline:

- How to create and edit complex parts, assemblies, and drawings
- The basics of 3D modeling and design, including surface modeling and advanced modeling techniques
- Best practices for documentation and communication of design ideas

- Techniques for designing and simulating complex systems, assemblies, and animations
- How to use the powerful tools in SolidWorks to create and refine product designs and presentations.

Target group

The course is perfect for anyone looking to develop their skills in SolidWorks, including designers, engineers, and hobbyists. Whether you're looking to expand your knowledge or just starting out, this course is designed to help you reach your full potential. you will have a thorough understanding of SolidWorks and its applications in product design and engineering. You will have the skills and knowledge needed to create complex and innovative designs, and you will have the confidence to tackle new design challenges.

Duration: 10 weeks with 4 hours of online class per week and an assessment every Friday.

Fee: K400,000.00

6, Solar Photovoltaic System Design, Installation and Maintenance

Malawi has an increased demand for affordable and sustainable energy supply, with the most viable energy source option being solar. This creates a need for personnel specialized in the sizing, installation and purchase of solar energy systems. MUST is offering a short course in Solar Photovoltaics (PV). The course provides participants with knowledge of solar energy resource, solar PV technologies, design of PV systems and skills in the installation, testing and commissioning and operation and maintenance (O&M) of solar PV systems.

The course seeks to provide comprehensive and up-to-date, theoretical and practical knowledge on Solar Photovoltaic System Design, Installation and Maintenance. The training course consists of lectures and practical session on design and installation and maintenance of Solar PV Systems. It will cover a variety of topics, including overview of solar PV technology, introduction to basic electricity, system design requirements and technical specifications, load estimation, battery storage, software systems and operation and maintenance.

Objective
By the end of the course, participants will be able to:
- Conduct measurement and calculations of Sun motion and variation of Sun path in a year at different location

- Conduct site survey for assessment of the feasibility of Solar PV installation
- Explain the various solar PV technologies for solar cell and panel and their recent development
- Monitor and analyse the performance of solar panel under the different operational conditions
- Explain the balance of Solar PV System that covers all other components in a Solar PV System except Solar panels
- Describe the structures of different Solar PV Systems and their applications in the market
- Design a grid-tied Solar PV System
- Design a Stand-alone Solar PV System
- Perform testing and commissioning a grid-tied Solar PV System
- Monitor the operation of a Solar PV System through a data acquisition and analyses
- Evaluate the performance of a Solar PV System and conduct preventive tests.

Synopsis

i)   Classroom Topics

- World Energy Scenario and Malawian Perspective, Renewable Energy Technologies, Role of Solar PV and policies in Malawi, Basics of Electricity, Introduction to Instruments
- Introduction to Solar Radiation, Optimum orientation of Solar PV Modules, Solar related measuring devices
- Solar PV Electricity, Introduction of Solar PV modules, Interconnections of PV modules, Impact of environmental parameters on module performance
- Introduction to Battery technologies, Charge Controller, MPPT, Solar PV inverters
- Types of Solar PV systems, Introduction to Solar PV system design
- Grid Solar PV system design with DC load, Grid Solar PV system design water pump, Example of Solar Power packs for homes/industrial applications, Example of Solar Power packs for homes/industrial applications
- Design of Grid, Connected Solar PV systems
- Wires and cable sizing, Junction Boxes, Combiner Boxes, Fuses,etc
- Solar PV system Installation, Monitoring and Trouble Shooting, Introduction to Solar lamps, Solar Products available in the market
- Design of PV System Using PVSyst, Single Line Diagram of PV System, MATLAB and ETAP PV Simulation, Solar PV System Design Using Excel Sheet

ii)   Proposed Laboratory Experiments

Solar Radiation Measurement, Measurement of PV module parameters, Series and Parallel connections of modules, Inverter, Recctifier and Transformer, Measurement of Battery, Charge Controller and Inverter parameters, Testing of Standalone PV system

iii)   Proposed Field Sessions

PV Panel Assembly, PV String Assembly, Grid connected PV Plant Assembly and Testing, PV plant Operation and Maintenance checks, Solar PV Modules/BoS components manufacturing site visit

Target group
The course is designed for those who intend to pursue a professional career in solar PV system design and installation such as installers, contractors, project managers, engineers, electricians, quality inspectors, technical support crew and customer service professionals in the solar energy industry. The course is also ideal for everyone who as a result of already working in this field needs to deepen knowledge about the theory and practical aspects of PV system installations. It is also perfect for complete beginners with zero experience. The course therefore unites participants from a wide range of personal backgrounds, such as students, electricians, engineers, energy professionals, architects, contractors, project developers, salespeople and anyone who has interest in renewable energy and wants to have good understanding of solar photovoltaic systems and installation.

Duration
Two weeks' full time (8am-5pm).

Fee: K350,000. Participants are expected to arrange for their own accommodation near the training venue as well as health cover during the practical period.

7, Micro Hydro Development, Design, Installation and Operation
Small scale hydropower projects can offer a more immediate opportunity to support rural electrification expansion, as well as contributing to energy and capacity support of the grid. There are also opportunities to develop small hydropower generation on existing water infrastructure, creating added value from dams and articulation assets.

The course explores the full project development cycle from site identification to operations and provides participants with an understanding of the key development risks and issues specific to small hydropower development. The course aims at equipping participants with relevant technical skill and experience in planning, designing, developing, and operation of small hydropower plants. This is inherently expected to increase the country's generating capacity thereby accelerating rural access to electrical energy which can be efficiently sustained with competent human resource capital.

The training course consists of lectures and practical sessions on design and installation, operation and maintenance of small hydropower systems. The training will involve lecture, practical lessons and field visit that would provide content on hydro design, project development process, quality control and assurance, electro-mechanical equipment, as well as operation and maintenance of a hydropower plant.

Expected Outcomes
By the end of the course, participants will be able to:

- Enhanced skills in trouble as well as operational and maintenance practices by hydropower plant operators to reduce downtimes and promote reliability of supply from small hydropower plants
- Knowledge enhancement in small hydropower scheme development with regard to quality control and assurance so as to promote sustainable and efficient power plants
- Improved competence in quality control and assurance during hydro power plant development.

Course Synopsis
- **Introduction to Micro and Small Hydropower Systems:** Overview of micro and SHP systems, rural electrification and other applications, economics, social and environmental aspects, sustainability issues
- **Basics of hydropower:** Hydrological cycle, types of hydropower plant and their layout, determination of power and energy, power plant structures and water turbines
- **Site survey:** Site identification, hydrological study, topographical and geology study, optimal utilization of stream potential, social and environmental impact assessment, elements of feasibility study, prefeasibility study, cost estimation, financial analysis, clearances, use of modern techniques such as GPS, RS and GIS for conducting investigations and assessment
- **Selection and Design of Electro-Mechanical Equipment of SHP:** Introduction to electro-mechanical equipment of SHP, selection of hydro turbine, governing system, design and construction of hydro turbine, selection of hydro generator and AVR and excitation system, design and construction of hydro generator automation, control and monitoring systems-various options and selection, abnormal operating conditions and protection system for safety of machines, selection of switchyard equipment, layout and main single line diagram, selection of power station auxiliaries and AC auxiliary system, battery, battery charger and DC systems
- **Operation and Maintenance of SHP:** Operation of SHP plants, operational problems and maintenance in SHP plants, control and protection equipment, standards and practices for operation and maintenance of electro-mechanical equipment, maintaining a SHP plant, renovation, life extension and upgrading of existing stations
- SHPP design (civil, hydraulic and mechanical components)

Target group
The course is designed for those who intend to pursue a professional career in hydropower system design and installation such as contractors, project managers, engineers, electricians in the hydropower industry. It is ideal for those already working in this field but need to deepen their knowledge about the theory and practical aspects of small hydro system installations. It is also perfect for complete beginners with zero experience.

The course, therefore, unites participants from a wide range of personal backgrounds, such as students, electricians, engineers, energy professionals, contractors, project

developers, and anyone who has interest in renewable energy and wants to have good understanding of small hydropower systems design, installation and operation.

Duration and Fees
The training will run for two weeks (8am--5pm). Fees is K350,000 but each participant will make self-arrangements for travel and accommodation during the training course.

8, Fundamentals of GIS

Geographic Information System (GIS) is one of the most powerful of all information technologies because it focuses on integrating knowledge from multiple sources and creates a cross-cutting environment for collaboration. The power of GIS also lies in its ability to combine a visualization environment using maps to communicate and visualize, with strong analytic and modelling framework. The use of GIS technology in various government departments and institutions, organizations, utility institutions and the industry at large is increasing and so is the demand for GIS skills. Many organizations and institutions are exploring ways on how they can integrate GIS in their operations to enhance communication, information sharing and decision making, maximize efficiency and increase their productivity.

The course is designed to introduce GIS basics, mapping and spatial analysis tools which can be used to solve different spatial problems in order to enhance decision making and improve communication.

Aim
The training aims to equip participants with GIS basics and equip them with hands-on skills in spatial data collection, manipulation, analysis, cartography and geo-visualization.

Learning Outcomes
Participants will be able to:
- Get a greater clarity of basic spatial data concepts and data types
- Understand spatial data acquisition techniques including Global Positioning System (GPS) data collection
- Acquire basic knowledge of manipulating spatial data
- Perform spatial data analysis procedures to derive information from spatial data
- Process raster and vector data using free and open source Desktop GIS software
- Visualizing spatial data using Desktop GIS software
- Create web maps
- Develop robust map-making skills

Indicative content
Introduction to GIS and GIScience; Introduction to GIS software; Spatial data models; Coordinate system and map projections; GIS data sources; Spatial databases; Spatial data analysis; Automating GIS workflows; Cartography and Geo-visualisation; and Web mapping.

Target group
Data managers, Statisticians, Academicians, Researchers, Cartographers, Project managers, Executive managers and Technical staff involved in disaster risk management, Conservation managers, Health specialists, social scientists, M&E experts, WASH specialists, Hydrologists, GIS professionals, professionals working in utility institutions, town planners, environmentalists, college students and anybody who works/will work with spatial data.

Duration: Five days (March 2023)

Fees: K250,000 and the course will be held at MUST campus in Thyolo.

9, Fundamentals of Remote Sensing and Image Interpretation
Remote sensing imagery has been extensively used in, among other areas, land-use and land cover mapping, soil mapping and land cover change detection and monitoring, urban planning and disaster risk management. Current developments in open source GIS and remote sensing software industry has increased the opportunity for individuals, organizations and government departments to process and interpret remote sensing imagery.

The course is designed to introduce fundamentals of remote sensing, satellite image and drone image processing procedures and skills.

Aim
The course seeks to equip participants with knowledge in fundamentals of applied remote sensing and demonstrate how GIS Software is used to process and interpret satellite images. In addition to understanding concepts of remote sensing, attendees will also have a hands-on experience on applications of GIS and remote sensing in land use/land cover mapping and change detection.

Learning Outcomes:
1. Understand basic fundamentals of remote sensing
2. Understand basic fundamentals of drone mapping technology and applications
3. Identify different types of remote sensing sensors and their characteristics
4. Identify methods of remote sensing data acquisition
5. Understand remote sensing image processing, interpretation and classification
6. Understand the application of remote sensing principles in land resource monitoring and disaster risk management

Indicative content: Fundamentals of remote sensing; Remote sensing data sources; Introduction to basic principles of drone photogrammetry; Drone image interpretation; Remote sensing image processing and interpretation; Supervised and un-supervised image classification; GPS data collection for accuracy assessment; Case studies on the application of Remote sensing in land use/ land cover change detection and disaster risk management; Map making.

Target group: Conservation managers, forestry officers, environmentalists, researchers, executive managers and technical staff involved in disaster risk management, project managers, academicians, professionals working in utility institutions, town planners, college students and those who work/will work with remote sensing data.

Duration: Five days (March 2023)

Fees: K250,000 and the course will be held at MUST campus in Thyolo.

Mode of Application

Applications for all short courses should be submitted through the email address: short-courses2023@must.ac.mw. An application form for the short courses is available on our website, www.must.ac.mw under "Downloads". Deadline for submission of short course applications is Monday, **March 13, 2023.**

Please only make your fees payment through bank deposits and submit your deposit slip as proof of payment. Bank details are as they are shared above and on the application form.

For any enquiries, please contact jmphande@must.ac.mw or 0999858447