Master of Science in Mechanical Engineering

Programme Goals and Objectives

Goals

The goals of the programme are to;

- Produce graduates who can address the energy problems of Uganda and the Africa region.
- Produce graduates who can solve practical problems in the manufacturing and production sector of Uganda and the Africa region.

Specific Objectives

The specific objectives of the programme are aligned to the specialized sub-disciplines within mechanical engineering that are to be offered.

Energy Systems Engineering

The specific objectives of the programme in this area are to produce creative and innovative graduates who are capable of:

- Managing complex technical and financial projects in utility companies, energy companies and manufacturing companies.
- Designing energy production, transport and storage systems.
- Using sustainable approaches to develop new and clean energy technologies.
- Understanding the complexities of energy technologies, the importance of energy demand, energy usage, energy policy and energy sustainability, and the impact of energy conversion on the environment.
- Analyzing and recommending energy options to policy makers of developing economies.
- Meeting the engineering, economic and environmental challenges facing energy systems in Uganda and in the region.

Manufacturing Engineering

The specific objectives of the programme are to produce graduates who are capable of:

- Developing new products.
- Designing production plants and equipment.

- Managing production processes and manufacturing industries.
- Producing and maintaining quality products.
- Designing and constructing production equipment and products.
- Enhancing competitiveness in manufacturing companies.
- Selecting materials and equipment for the manufacturing and production sector.

Employment Opportunities

The graduate of the programme will in general find opportunities for employment in the sub-disciplines offered.

Energy Systems Engineering

The graduates of the Energy Systems Engineering specialization shall find jobs in;

- Power production companies as Design and Process Engineers.
- Engineering companies as Project Engineers.
- Energy equipment manufacturing companies as Project Design Engineers.
- Research organizations and consultancy firms as Designers and Developers of new products for energy equipment manufacturers.
- Government Energy Departments as Energy Policy Makers.
- Various organizations where energy conversion occurs as Energy Advisors/ Specialists.
- Chemical and Petroleum processing plants

Manufacturing Engineering

The graduates of the Manufacturing Engineering programme shall find jobs in;

- Manufacturing companies.
- Research and Development Organizations
- Consulting firms
- Government departments
- Sales companies
- Mining sector (material flow system)

Target Group

There is a growing number of private and government universities which need trained manpower. The National Council for Higher Education demands highly qualified members of staff in these institutions. The graduates will no longer have to go outside Uganda for some of the training courses which are offered in the Department of Mechanical Engineering.

The School of Engineering has been attracting graduates from other countries like Mozambique, Ethiopia and Malawi and other neighbouring countries. Most the courses are offered by lecturers who are members of staff from the Department of Mechanical Engineering; mostly in the areas of energy and production engineering.

There is a good number of graduates who have been working in the field for over five years. During the time of their work, they acquire skills. At the same time there are developments in the areas of technology and new courses being taught. Thus the working class of engineers is one of the target groups.

Mode of Leaning and Teaching

The programme will be conducted through lectures, laboratories, industrial visits, assignments, seminars, project work, and/or research.

PROGRAMME IMPLEMENTATION

The M.Sc Mechanical Engineering Program is to be based on two plans namely, Plan A and Plan B, as follows;

Plan A: Coursework and Dissertation

Plan B: Extended Coursework and Project Report

Admission Requirements

To qualify for admission for Master's Degree Programmes, the candidate must hold a Bachelor's degree in engineering in a scientific or technological field. All other admission requirements and regulations of Makerere University shall apply.

- An applicant must be a holder of at least a Second Class degree or its equivalent awarded by Makerere University or any other recognized institution.
- An applicant who is a holder of a third class degree or its equivalent may be admitted only after providing evidence of academic growth and maturity in the desired field of study as judged by the Board of Graduate Studies and Research.

Attachments

Attachment Name	Attachment Type	
Master of Science in Mechanical Engineering	DOC	PDF

Energy Systems Engineering

PLAN A: Programme Structure

Programme for Courses in Semester I

Semester I - 5 courses (four compulsory one elective)						
Code	**Course Name**	**LH**	**PH**	**TH**	**CH**	**CU**
RET7105	Statistics and Research Methods	40	0	10	45	3
MEC7105	Principles of Management	45	0	0	45	3
MEC7106	Thermo-chemical Energy Engineering	35	10	10	45	3
MEC7107	Measurement Techniques in Engineering	30	15	15	45	3
Elective (Student Selects Only one Course)						
MEC7108	Hydropower Systems	30	15	15	45	3
MEC7109	Two Phase flow and Heat Transfer	35	10	10	45	3
MEC7110	Solar Energy Technology	30	15	15	45	3

Programme for Courses in Semester II

Semester II 5 courses (four compulsory one elective)						
Code	**Course Name**	**LH**	**PH**	**TH**	**CH**	**CU**
EMT7201	Advanced Engineering Mathematics	30	0	15	45	3
RET 7203	Project Management	45	0	0	45	3
MEC7229	Conventional Power Generation	35	10	10	45	3
MEC7230	Numerical Methods in Energy Engineering	40	0	10	45	3

Elective (Student Select Only one Course)						
MEC7231	Energy Management	35	10	10	45	3
MEC7232	Other Alternative Energy Resources	35	10	10	45	3
MEC7233	Modelling and Simulation of Energy Technology	40	0	10	45	3

Semester III and Semester IV

Semester III						
Code	**Course Name**	**LH**	**PH**	**TH**	**CH**	**CU**
MEC8100	Dissertation	0	200	0	150	10
MEC8101	Research Seminar I	0	60	0	30	2
Semester IV						
MEC8201	Research Seminar II	0	60	0	30	2

PLAN B : Programme Structure

Programme for Courses in Semester I

Semester I 5 courses (four compulsory one elective)						
Code	**Course Name**	**LH**	**PH**	**TH**	**CH**	**CU**
RET7105	Statistics and Research Methods	40	0	10	45	3
MEC7105	Principles of Management	45	0	0	45	3
MEC7107	Measurement Techniques in Energy Engineering	30	15	15	45	3
MEC7106	Thermo-chemical Energy Engineering	35	10	10	45	3

Elective (Student Select Only one Course)						
MEC7108	Hydropower Systems	30	15	15	45	3
MEC7110	Solar Energy Technology	30	15	15	45	3
MEC7111	Biochemical Engineering	35	10	10	45	3

Programme for Courses in Semester II

Semester II 4 courses (Four compulsory one elective)						
Code	**Course Name**	**LH**	**PH**	**TH**	**CH**	**CU**
EMT7201	Advanced Engineering Mathematics	30	0	15	45	3
RET7203	Project Management	0	0	0	0	3
MEC7230	Numerical Methods in Energy Engineering	40	0	10	45	3
MEC7229	Conventional Power Generation	35	10	10	45	3
Elective (Student Selects Only one course)						
MEC7231	Energy Management	35	10	10	45	3
MEC7232	Other Alternative Energy Resources	35	10	10	45	3
MEC7233	Modelling and Simulation of Energy Technology	40	0	10	45	3

Programme for Courses in Semester III and IV

Semester III Four courses (Three Compulsory, one Elective)

Code	Course Name	LH	PH	TH	CH	CU
MEC8101	Seminar	0	30	0	30	2
MEC8102	Impact of Energy Generation on Environment	40	0	10	45	3
TID8102	Safety, Health & Environment Management	45	0	0	45	3
Electives (Student Selects one course)						
MEC7109	Two Phase flow and Heat Transfer	35	10	10	45	3
MEC8103	Advanced Heating, Refrigeration and air-conditioning	40	0	10	45	3
Semester IV One Course Compulsory						
MEC8200	Research Project and report	0	150	0	75	5

MANUFACTURING ENGINEERING

PLAN A Programme Structure

Programme for Courses in Semester I

Semester I 5 courses (three compulsory and two elective)						
Code	**Course Name**	**LH**	**PH**	**TH**	**CH**	**CU**
MEC7105	Principles of Management	45	0	0	45	3
MEC7112	Manufacturing Processes and Product Quality Control	45	0	0	45	3
RET7105	Statistics and Research Methods	45	0	0	45	3
Electives (Student Select Only two Courses)						
MEC7113	Business and Operations Strategy	45	0	0	45	3

MEC7114	Energy management	45	0	0	45	3
MEC7115	Computer Aided Manufacturing	34	52	0	60	3
MEC7116	Applied Linear Algebra	45	0	0	45	3

Programme for Courses in Semester II

Semester I Five courses (Three compulsory two elective)						
Code	**Course Name**	**LH**	**PH**	**TH**	**CH**	**CU**
EMT7201	Advanced Engineering Mathematics	45	0	0	45	3
RET7203	Project Management	45	0	0	45	3
MEC7234	Manufacturing Modelling and Analysis	45	0	0	45	3
Electives (Student Select Only two Courses)						
MEC7236	Advanced Manufacturing Materials	30	30	0	45	3
MEC7237	Asset Management	45	0	0	45	3
MEC7238	Automation	30	30	0	45	3
TID7202	Logistics Engineering	45	0	0	45	3

Programme for Courses in Semester III and Semester IV

Semester III						
Code	**Course Name**	**LH**	**PH**	**TH**	**CH**	**CU**
MEC8100	Dissertation	0	200	0	150	10
MEC8101	Research Seminar I	0	60	0	30	2
Semester IV						

MEC8201	Research Seminar II	0	60	0	30	2

PLAN B Programme Structure

Programme for Courses in Semester I

Semester I 5 courses (three compulsory and two elective)						
Code	**Course Name**	**LH**	**PH**	**TH**	**CH**	**CU**
MEC7105	Principles of Management	45	0	0	45	3
MEC7112	Manufacturing Processes and Product Quality Control	45	0	0	45	3
RET7105	Statistics and Research Methods	45	0	0	45	3
Elective (Student Select Only two Courses)						
MEC7113	Business and Operations Strategy	45	0	0	45	3
MEC7114	Energy management	45	0	0	45	3
MEC7115	Computer Aided Manufacturing	34	52	0	60	3
MEC7116	Applied Linear Algebra	45	0	0	45	3

Programme for Courses in Semester II

Core Courses (Compulsory)

Semester I Five courses (Three compulsory, two elective)						
Code	**Course Name**	**LH**	**PH**	**TH**	**CH**	**CU**
EMT7201	Advanced Engineering Mathematics	45	0	0	45	3
RET7203	Project Management	45	0	0	45	3
MEC7235	Manufacturing Modelling and Analysis	45	0	0	45	3

Elective (Student Select Only two Courses)						
MEC7236	Advanced Manufacturing Materials	30	30	0	45	3
MEC7237	Asset Management	45	0	0	45	3
MEC7238	Automation	30	30	0	45	3
TID7202	Logistics Engineering	45	0	0	45	3

Programme for Courses in Semester III and Semester IV

Semester I Three Courses (Two compulsory one elective)						
Code	**Course Name**	**LH**	**PH**	**TH**	**CH**	**CU**
MEC8101	Seminar	0	30	0	30	2
TID8102	Safety, Health & Environment Management	45	0	0	45	3
Elective (Student Select Only one Course)						
TID8104	Life-Cycle Analysis and Sustainability	45	0	0	45	3
TID8105	Advanced Product Design and Development	45	0	0	45	3
Semester IV						
One Core course						
MEC8200	Research Project and report	0	150	0	75	5

The total unit for student to graduate are 60.

LH- lecture hour, TH - tutorial hour, PH- practical hour, CH -Contact hour, CU- credit unit