General Information about Master of Science in Physics Program

1.1 Title of programme

The Department of Mathematics and Physical Sciences, in accordance with the general objectives of Maasai Mara University (MMU) offers a programme of studies leading to Master of Science in Physics abbreviated MSc (Physics).

1.1.1 Academic organization of the programmes reflecting academic quarters/ trimester/ Semesters

Maasai Mara University has adopted a semester system where an academic year runs for two semesters each consisting of 13 weeks of teaching and 2 weeks of end of semester exams.

Definitions of terms

a) **Credit hours**
   This refers to the total number of hours required to be taught per week which for this program is 4. This translates to 52 credit hours per semester of 13 weeks.
b) **Lecture/instructional hours**
   Means a period of time equivalent to one hour and representing one such instructional hour in lecture form, two in a tutorial or open learning session, three in a laboratory practical or practicum and five in farm or similar practice.
c) **Contact Hours**
   Synonymous with Lecture/instructional hours
d) **Course Units**
   A course unit is a defined curriculum that forms part of an academic programme.

2.0 CURRICULUM

2.2 Philosophy of the programme

With the ever-changing needs of the global economy, demands in science also changes. For any technology to succeed, trained personnel is needed to sustain it through academic rigor, partnership with the industry and research institutions. The MSc in Physics programme is designed to respond to the dynamic demands of the world.

2.3 Rationale of the programme

Postgraduate degree Programs normally form an integral part of a University, to serve the general purpose of developing research capabilities through dedicated and persistent scholarship as well as providing relevant trained manpower needed for teaching at institutions of higher learning and/or carrying out research in Academic, public and private institutions.

The program includes a set of common core courses in physics in the first semester which are compulsory. Individually courses and a tailored lab component and are offered in the second semester in the area of specialization. The research work runs right from the time of entry of the student until successful submission of thesis under the guidance of area specialists. The MSc in physics research will be offered in the following areas of specialization;

i. Material Science
ii. Electronics
iii. Renewable energy.

2.3.2 Stakeholders involvement

The Commission for University Education estimates that for Kenya to meet her higher education knowledge needs, there is need for production of 1000 PhDs per year. The route to PhD is a Masters degree. To contribute to this national need, the former students who excelled in Physics (1st class honours) are to be retained and trained in the department. Also personal research by members of the department, report that the portfolio of the department and the university will remain at all time without the research component which is well accomplished only with graduate programmes. The MSc (Physics) curriculum has therefore been designed in such a way that the product will have relevant market skills in the three specialization areas in addition to the general physics knowledge acquired in the course of study

2.3.3 Justification of the programme

High-level skilled manpower is essential for strong, sustainable and balanced growth. The number of people at work and how productive they are depends on available opportunities to acquire and maintain certain skills. The MSc. (Physics) programme offers specialized training opportunities to industry and the academia to help maintain the desired balance in economic development.

2.4 Goals of the Programme

The program aims to train advanced personnel competent in either Electronics, Material Science and Renewable energy, who are well equipped to meet the challenges in industry. This would be possible since the programme will enable students to:

i. Develop professional competence in carrying out laboratory research and be proficient in critical analysis of important scientific articles;
ii. Develop general competence in Physics and in-depth knowledge in their chosen area;
iii. Plan, execute, report, and defend an original piece of research relevant to their study.
iv. Extend and redefine existing knowledge in physics.
v. Demonstrate good mastery of physics
vi. Display originality and creativity in the application of knowledge, skills and practice in the field of physics
vii. Contribute to advanced knowledge and skills in the field of physics
viii. Demonstrate a substantial authority, innovativeness, autonomy, scholarly and professional integrity and with sustained commitment to the development of new ideas or processes at the forefront of the discipline or field of physics

2.5 Expected learning outcomes of the programme

2.5.1 The expected learning outcomes of the programme

a) Knowledge and understanding

The physics programme enables students develop competencies required to:

i) Solve problems in Physics and offer relevant solutions using appropriate mathematical tools.
ii) Understand physical phenomena and model their behaviour through analytical and/or mathematical techniques.
iii) Apply principles of operation of physical devices and instruments
iv) Know the environmental and social impact of a Physicist's activities

b) Cognitive skills/Application of knowledge

The physics graduate should be able to:

i) Execute and critically analyze results of an investigation and make logical conclusions.
ii) Use scientific principles in solutions of physical problems.
iii) Formulate research proposals, conduct the research, analyze data obtained from the research and report accurately in various branches of physical processes.
iv) Use computers in the manipulation of physics problems

2.5.2 The expected learning outcomes of the specialization areas

i) Understand business and management techniques relevant to a Physicist
ii) Execute and critically analyze results of an investigation and make logical conclusions.
iii) Formulate research proposals, conduct the research, analyze data obtained from the research and report accurately in various branches of physical processes.
iv) Publish the work in refereed journal
v) Write and defend the thesis of their work

2.6 Mode of Delivery and Duration of the programme

2.6.1 Mode of Delivery

Coursework will be delivered through lectures. Other modes may include; simulations, group discussions, practicals, report writing and assignment.

The student under supervision of senior faculty will undertake research in the chosen area of specialization

2.6.1 Duration of the programme

The MSc (Physics) programme is by research and course work.

The MSc (Physics) programme will take a minimum of 2 academic years of 2 semesters each for full time students and a minimum of 3 years part-time students.