

CURRICULUM DEVELOPMENT AND REVIEW

MAY, 2018

TABLE OF CONTENTS

CONTENT	PAGE
1 INTRODUCTION	1
1.1 Vision Statement	2
1.2 Mission Statement	2
1.3 Core Values	2
1.4 Guiding Philosophy	2
2 PURPOSE OF THE GUIDELINES FOR CURRICULUM DEVELOPMENT AND REVIEW	2
3 CURRICULUM DEVELOPMENT AND REVIEW PROCESS	2
3.1 Origination	3
3.2 Role of the Departmental Board	3
3.3 Role of the Faculty Board	4
3.4 Role of the Joint Curriculum Review Committee	4
3.5 Role of the Planning and Quality Assurance Unit	4
3.6 Role of the Academic Board	4
4 GENERAL FORMAT FOR CURRICULUM DEVELOPMENT	4
4.1 Information for Approval of a New Programme	5
4.1.1 Title Page	5
4.1.2 Title and Level of Programme	5
4.1.3 Support and Consultations	5
4.1.4 Rationale for the new Programme	5
4.1.5 Aims and Objectives of the Programme	6
4.1.6 Student Learning Outcomes for the Programme	6
4.1.7 Date of Commencement of New Programme	8
4.1.8 Students' Admission, Progression and Graduation Requirements	8
4.1.9 Employment	9
4.1.10 Components of the Programme	9
4.1.11 Course Description	11
4.1.12 Assessment of Students' Performance and Mode of Certification	13
4.1.13 Resource Implications	14
4.1.14 Student Enrolment Plan	16
4.1.15 References	17
4.2 Information for Review of Existing Programme Approval	17
4.2.1 Title Page	17

4.2.2	Title and Level of Programme	17
4.2.3	History of Programme	17
4.2.4	Department/School Offering Programme	18
4.2.5	Support and Consultations	18
4.2.6	Rationale for the Review	18
4.2.7	Aims and Objectives of the Programme	19
4.2.8	Student Learning Outcomes for the Programme	19
4.2.9	Date of Commencement of the Review Programme	20
4.2.10	Students' Admission, Progression and Graduation Requirements	20
4.2.11	Employment	22
4.2.12	Components of the Programme	22
4.2.13	Course Description	23
4.2.14	Assessment of Students' Performance and Mode of Certification	25
4.2.15	Changes in Curriculum	26
4.2.16	Resource Implications	26
4.2.17	Existing Staff Situation	26
4.2.18	List of Publications and Technical Reports of Staff	27
4.2.19	Additional Staff Requirement	27
4.2.20	Details of Staff Development Plan	27
4.2.21	Physical Resources	27
4.2.22	Financial Resources	27
4.2.23	Linkages and Memoranda of Understanding (MOU) with other Institutions	28
4.2.24	Student Enrolment Plan	29
4.2.25	Data for Staff/Student Ratio (SSR)	29
4.2.26	Student Work Load	30
4.2.27	Graduate Output to Date	30
4.2.28	Development since Last Accreditation	30
4.2.29	NAB Recommendations Implemented	31
4.2.30	References	31
4.3	Format for Introducing a New Course	31
4.4	Format for Reviewing Existing Course	33
4.5	Format for Retiring a Course	35
5	CHECKLIST FOR CURRICULUM APPROVAL WITHIN UM_aT	36
5.1	Checklist for the Department	36
5.2	Checklist for the Faculty	37
5.3	Checklist for the Academic Board	37

6	CHECKLIST FOR CURRICULUM APPROVAL OUTSIDE UMaT	37
6.1	National Council for Tertiary Education	37
6.2	National Accreditation Board	38
7	WRITING LEARNING OUTCOMES	39
7.1	Course Purpose and Outline	39
7.2	Learning Outcomes	39
7.3	Teaching and Learning Activities	41
7.4	Assessing Learning Outcomes	41
	Appendix A: Cover Page of Proposed New Programme	42
	Appendix B: Cover Page of Proposed Review of Existing Programme	43

1. INTRODUCTION

The University of Mines and Technology (UMaT) originally started as the Tarkwa Technical Institute (TTI) on 3rd November, 1952 but was officially commissioned by the then Government of Ghana, more precisely by His Excellency the Governor of the Gold Coast, Sir Charles Noble Arden Clarke, on 7th October, 1953. In 1961, the Government, upon the advocacy of the Ghana Chamber of Mines redefined the mission of TTI to incorporate the training of mining technicians and other middle level manpower for the country's mining and related industries. In that same year, it was reorganised to become the Tarkwa School of Mines (TSM) to train the required manpower for the mining and allied industries in Ghana.

In 1976, the Government took cognisance of the capability of TSM and its strategic location, Tarkwa, which is at the centre of mining activities in the country. As this location gave TSM a special strength for mining education, TSM was affiliated to the Kwame Nkrumah University of Science and Technology (KNUST) as a faculty of the University to enable TSM offer degree, diploma and certificate programmes in mining and related fields. The name TSM was changed to KNUST School of Mines (KNUSTSM) Tarkwa. The KNUSTSM, Tarkwa and the Kumasi School of Mines were put together to become the Institute of Mining and Mineral Engineering (IMME).

In 1988, a University Rationalisation Committee (URC), commissioned by the Ministry of Education, recommended the development of the school and its conversion into a University. In 2000, the conversion of KNUSTSM into a University was again strongly recommended by Louis Berger Inc. in association with Kwame Asante and Associates in the report on partial commercialisation of KNUST.

In 2001, the Council of KNUST considered and approved proposals and recommendations of the Academic Board to merge the School of Mines at Kumasi and the School of Mines at Tarkwa into Western University College of KNUST, Tarkwa.

On 3rd November, 2004, at exactly 11.35 GMT, the Parliament of the Republic of Ghana passed the bill of the University of Mines and Technology into an Act of Parliament. On 11th November, 2004, the President of Ghana gave the Presidential Assent and on 12th November, 2004 the University of Mines and Technology, Tarkwa Act 2004 (Act 677) was gazetted and thus, became a law. Under its relatively new university status, UMaT needs to find answers to the following questions:

- a. How could the University diversify its curriculum and increase linkages with its stakeholders?
- b. What should be done to ensure a meaningful role for the University to amplify its relevance, and strategically position itself in the 21st century as a centre of excellence?
- c. What should be done to achieve the objectives of the University?

To find the answers, the University seeks to provide some guidelines to develop and revise its curriculum. Hence, it has come up with these guidelines to assist in planning and implementing high quality instructional programmes.

This is a structured document that delineates the philosophy, goals, objectives, learning experiences, instructional resources and assessments that constitute a specific educational programme. Additionally, it represents an articulation of what students should know and be able to do while equipping lecturers to achieve the set goals and objectives.

1.1 Vision Statement

The vision of the University is to become a Centre of Excellence in Ghana and Africa for producing world-class professionals in the fields of mining, technology and related disciplines.

1.2 Mission Statement

The mission is to provide higher education in mining, technology and related disciplines, to promote knowledge through effective teaching and learning; to promote knowledge through active research and dissemination of information and to offer professional services through extension activities to the mining and allied industries.

1.3 Core Values

The core values of the University are Knowledge, Truth and Excellence.

1.4 Guiding Philosophy

The philosophy of UMaT is to guide students to develop their intellectual capabilities and appreciate good social and moral values. The major aim is to produce world-class graduates capable of providing useful professional services.

2 PURPOSE OF THE GUIDELINES FOR CURRICULUM DEVELOPMENT AND REVIEW

UMaT curriculum development process systematically organises what will be taught, who will be taught, and how it will be taught. Each component affects and interacts with other components. This curriculum development and review guideline is to provide an overview of the curriculum development process and to set out a series of steps to follow in creating curriculum documents, whether new or revised versions.

3 CURRICULUM DEVELOPMENT AND REVIEW PROCESS

Departmental Board, Faculty Board, Academic Board, and Planning and Quality Assurance Unit (PQAU) shall manage the curriculum through shared oversight. Departmental Board members shall develop the curriculum, recommend for approval

all curricular and evaluate the effectiveness and currency of the curriculum. The PQAU shall develop processes to assist the Boards in the oversight of the curriculum and develop the resources for academic programmes.

3.1 Origination

Curriculum developments shall be originated by a Departmental/Faculty/Academic Board member and/or any other stakeholder. Each curriculum development shall be detailed on the appropriate form initiated by the originator. The Form (see Appendix A) shall be available at the various Departments or online at the University website. Proposed new programmes/courses and/or review of existing programmes/courses shall be undertaken and endorsed by the Department with responsibility for the curriculum.

3.2 Role of the Departmental Board

The Departmental Board shall undertake the following:

- a. Develop/review curricula, through a Departmental Curriculum Committee which shall consist of, at least, three members. In addition, several other groups may forward curriculum proposals to the appropriate academic departments.
- b. Initiate the curricular change to assess the impact of the proposed change and consult with those who may be affected.
- c. Forward proposals for review of curriculum to Faculty Boards to review and act on all proposals.
- d. Use multiple sources of qualitative and quantitative data, including feedback from students and stakeholders in the evaluation of its courses, programmes and teaching.
- e. Review the content and focus of the courses; evaluate and reflect on student learning resulting from their teaching practice, curriculum design and approaches to assessment; and make appropriate revisions as required.
- f. Ensure that the document is formatted in accordance with the UMaT and NAB regulations and checklist.
- g. Forward its recommendation(s) together with all supporting documents to the Faculty Board for consideration.

Proposals to change existing courses shall not be used to avoid the full review accorded to proposed new courses. If a department is proposing several changes at once (e.g., changing title, description, and prerequisites), this may indicate that the department is not revising an existing course but creating a new one. In such a case, the department should propose to drop the old course and add a new one, and the Faculty or Academic Board may so determine and may return proposals to originating departments with instructions to proceed in that manner.

3.3 Role of the Faculty Board

The Faculty Board shall undertake the following:

- a. Review and appropriately endorse for action curricula developments approved and submitted to it by the Departmental Board.
- b. Reject, return for clarification or recommend proposals for approval to the Academic Board.
- c. Ensure that the document is formatted in accordance with the UMaT and NAB regulations and checklist.

At all review levels in the curriculum process, changes to a proposal can only be made with the concurrence of the body that initiated the proposal.

3.4 Role of the Joint Curriculum Review Committee

The Joint Curriculum Review Committee, which is made up of all the Deans of Faculty/School, Heads of Department/Centre, Dean of PQAU and chaired by the Pro Vice Chancellor, shall consider and harmonise the curriculum of all the Departments to ensure total compliance with UMaT and NAB standards and forward their report to the Academic Board for final approval.

3.5 Role of the Planning and Quality Assurance Unit

The Planning and Quality Assurance Unit (PQAU) shall undertake the following:

- a. Ensure strict adherence to quality at all levels of the review process
- b. Organise training workshops for Departmental Curriculum Committee and the Faculties/Schools from time to time.
- c. Support the Departments to seek peer and professional assessment as well as conduct tracer studies.

3.6 Role of the Academic Board

The Academic Board shall undertake the following:

- a. Hold the primary responsibility for examining the implications of curriculum proposals/reviews at the university level and it shall give its full attention to all proposals and approve or reject them.
- b. Submit approved curricula to the National Council for Tertiary Education (NCTE) for recommendation for onward submission to National Accreditation Board (NAB).

4 GENERAL FORMAT FOR CURRICULUM DEVELOPMENT

The following sub-sections outline the general format and actions needed to be taken for curriculum development in UMaT. They cover information for the approval of new programmes, review of existing programmes, format for introducing a new course, format for reviewing existing course and format for retiring a course.

4.1 Information for Approval of a New Programme

In order to introduce a new programme at UMaT, the following format shall be used.

4.1.1 Title Page

Provide the following for the title page: Name of the University, Name of the Faculty, Name of the Department, Proposed New Programme, Name of the Programme, Month and Year. A specimen title page is shown in Appendix B.

4.1.2 Title and Level of Programme

Provide the title and level of the new programme. Example:

Title of Programme: Subsea Engineering
Level of Programme: PhD/MPhil/MSc/BSc/PgD

4.1.3 Support and Consultations

Support: Provide a statement indicating that the proposed programme has the support and approval of the Departmental Board. Example: The Petroleum Engineering Department has developed curricula for Postgraduate Programmes in Subsea Engineering. This document was considered and approved at the 21st Departmental Board Meeting held on 9th of February, 2017. I therefore forward the document for consideration by the Faculty Board.

Consultations: Provide a statement indicating the level of consultations with academic institution(s), appropriate professional and/or relevant industrial group(s).

Example: The Department has consulted and included the comments of the Jubilee Technical Training Centre, GE Oil and Gas Limited, Petroleum Commission, Worleyparsons Atlantic Limited and University of Port Harcourt, Nigeria. The comments are attached as SP1 for your perusal and consideration.

4.1.4 Rationale for the new Programme

Provide a statement indicating the rationale for the proposed new programme. For example, Subsea Engineering is perhaps one of the most important, yet most difficult aspects of the offshore petroleum industry. The underwater production environment presents unique challenges to subsea engineers, particularly deep water operations where temperature, pressure and corrosion test the durability of submerged equipment and tools. Most subsea engineering operations depend on automation and remote procedures to construct and repair components beneath the surface of the water. With the discovery of oil and field development offshore Ghana, and the expected increase in offshore oil fields, Ghana nationals need to acquire the needed expertise to function in such respect and to fill its local content requirement for energy companies in the country.

Career opportunities for subsea engineers are fantastic, especially as offshore oil and gas reserves are increasingly important sources of energy, as well as a significant driver of the national and international economy. There are billions of barrels of oil and trillions of cubic feet of natural gas predicted to lie underneath tens of thousand feet of water, presenting unprecedented engineering challenges. As such, nearly every energy company operating in the offshore sector employs subsea engineers, and demand for engineers with expertise in developing offshore energy resources is on the rise. An institution offering a degree in this area locally will increase the participation of Ghanaian nationals in the global oil production business. The University of Mines and Technology (UMaT), an institution with solid mechanical, electrical and electronics and petroleum engineering programmes and with solid industrial collaboration is well positioned to be the first Ghanaian University to train professionals for such sorted subsea engineering discipline.

4.1.5 Aims and Objectives of the Programme

Provide a statement indicating the aims and objectives of the programme as it fits into the mission, vision and core values of the University as well as the national demand for the programme. For example, The Postgraduate Programme in Subsea Engineering is aimed at providing formal research-based training to update and/or upgrade the knowledge of professionals working in offshore petroleum related fields locally and internationally to be abreast with the sophisticated and fast-evolving technologies employed in subsea development. The development of human capital will also serve to respond to the Ghana Government's quest to improve upon local content development for the oil and gas sector of the economy. The main objectives of the programme are to:

- a. Train and upgrade the knowledge of engineers to cope with the complexities associated with subsea technology and related safety issues.
- b. Enhance the diversification and competence of personnel in the fast-evolving technologies employed in subsea operations.
- c. Produce competent postgraduates capable of making a career in industry, research and teaching.

4.1.6 Student Learning Outcomes for the Programme

Provide a statement/list indicating the student learning outcomes for the programme. This must show the set of knowledge and skills a graduate of the programme should have and must be in line with the graduate learning output of the Faculty and the University. For example, the thematic areas of the Petroleum Engineering programme are the following;

- a. Drilling Engineering
- b. Reservoir Engineering
- c. Production Engineering

- d. Petroleum Economics
- e. Environment, Health and Safety
- f. Soft Skill

At the end of the programme, graduates should be able to do the following under the thematic areas.

a. Production Engineering

- i. Describe and design basic surface and subsurface production equipment for oil and gas reservoirs and manage production facilities.
- ii. Describe fluid flow performance profile from the reservoir to surface; and fluid processing, transportation and storage.
- iii. Diagnose and prescribe remediation measures for production problems.

b. Reservoir Engineering

- i. Characterise petroleum reservoirs and reservoir fluids; explain rock-fluid interactions; estimate reserves, discuss reservoir drive mechanisms; and predict future reservoir performance.
- ii. Describe and estimate fluid flow in porous media; discuss petroleum recovery methods; and apply reservoir engineering principles for optimal field development.

c. Petroleum Economics

- i. Discuss the factors affecting energy demand and supply; analyse the operation of the physical and financial oil markets; and discuss world petroleum fiscal regimes.
- ii. Discuss profitability indicators and investment decision making tools; evaluate the economic viability of petroleum investment opportunities and quantify risk and uncertainty.

d. Soft Skills

- i. Apply critical thinking to identify, formulate, analyse and solve engineering problems in a global, societal, and economic context.
- ii. Communicate effectively by written, and verbal; and demonstrate computing skills necessary for everyday work of an engineer.
- iii. Acquire professional and ethical responsibility and engage in lifelong learning

e. Environmental, Health and Safety

- i. Identify the sources of petroleum wastes and their management and describe the proactive approach to managing operations.
- ii. Recognise the need for Environment, Health and Safety (EHS) regulations and compliance; identify, assess petroleum related health and safety issues and describe their control.

- f. Drilling Engineering
- i. Identify and describe the various drilling methods, types, operations, controls and equipment.
- ii. Design and manage drilling programmes (drilling fluids, cement slurries, casing, drilling assembly (BHA), etc.) for efficient wellbore management.

4.1.7 Date of Commencement of New Programme

Indicate the academic year that the new programme shall be implemented with its first year students. For example: Adoption and teaching of the new course content is intended to start at the beginning of the 2017/2018 Academic Year with the fresh students.

4.1.8 Students' Admission, Progression and Graduation Requirements

Indicate the minimum qualifications for admission into the programme, progression and graduation requirements.

Admission requirements

Indicate the minimum requirement for applicants with the following qualifications:

SSCE candidates: Candidates must have credit passes (A-D) in THREE CORE SUBJECTS in English Language, Mathematics and Integrated Science and passes in THREE SCIENCE ELECTIVES in Physics, Chemistry and Mathematics.

WASSCE candidates: Candidates must have passes (A1-C6) in THREE CORE SUBJECTS in English Language, Mathematics and Integrated Science and passes in THREE SCIENCE ELECTIVES in Physics, Chemistry and Mathematics.

GCE advanced level candidates: Candidates must have passes in THREE (3) SUBJECTS (at least, one of the passes should be Grade D or better). Also, the applicant must have had credits passes (Grade 6) in five (5) GCE ORDINARY LEVEL subjects including English, Mathematics and an Arts subject for science students.

Mature candidate: Candidates must have attained 25 years of age and must have passes in FIVE SUBJECTS at SHS LEVEL including English Language and Mathematics or credits in FIVE SUBJECTS at GCE ORDINARY LEVEL including English Language and Mathematics. In addition, candidates must have relevant working experience and must pass an interview conducted by the Department.

International Students: International applicants from an accredited/recognised institutions who satisfy any of the following requirements or their equivalent will be considered for admission.

- (a) International Baccalaureate in Science plus Certificate of Proficiency in english. Please note that all certificates shall be translated into English. Equivalences with

regard to the certificates would be sought at the National Accreditation Board by the University.

- (b) SSSCE/WASSCE/NECO Certificate: Credits in core English Language, core Mathematics and elective Physics, Chemistry and other relevant subjects
- (c) GCE/IGCSE O'Level and A'Level Certificate: Credits in English Language, Mathematics and other relevant subjects at the O'Level plus three passes at the A'Level in Physics, Mathematics and Chemistry

Progression

Provide the Credit, and any additional programme requirements for progression.

Example: course registration, lectures, field trips, industrial attachments, participation in continuous assessment and end of semester examinations.

Graduation Requirements

Indicate the Course, Credit, and any additional requirements for graduation.

Example:

a. Course Requirements

- i. Pass all required courses
- ii. Submit reports on all fieldtrips and industrial attachments
- iii. Achieve a cumulative weighted average mark of 50% or above
- iv. Complete a supervised project work in the final year

b. Credits Requirements

Achieve a minimum of 148 credits

c. Any additional requirements for graduation

- i. A student shall be deemed to have satisfied the requirements for graduation, if:
- ii. He/she has satisfied all Department and Faculty requirements;
- iii. He/she has accumulated the minimum number of credits by the Faculty, including core and prescribed electives.

4.1.9 Employment

Provide a list of all the areas in which the students are likely to be employed. For example, universities and educational institutions, mining, mineral, petroleum and allied industries, etc.

4.1.10 Components of the Programme

Provide details of the curriculum in a tabular form to include the following:

- a. Course Code
- b. Course Title
- c. Credit Hour(s)
- d. Research Component
- e. Practical Training, Fieldtrips, Industrial Attachment, etc.

NB: The UMaT Course Coding Philosophy must be used, noting the following explanations:

- i. Alphabets: Department
- ii. 1st digit: Year of study
- iii. 2nd digit: 1-4 for sub-degree courses
5-6 for common courses
7-9 for departmental courses
- iv. 3rd digit: Odd number for 1st semester
Even number for 2nd semester
- v. T - Teaching Hours
- vi. P - Hours for Practicals, Tutorial, Laboratory Work, Fieldwork, etc.
- vii. C - Credit Hours

For example:

- a. MN 141: Basic French I is a first year sub-degree first semester course.
- b. MR 157: Communication Skills I is a first year common first semester course.
- c. EL 252: Literature in English II is a second year common second semester course.
- d. GM 376: Ghana Land Law is a third year departmental second semester course.
- e. MC 465: Industrial and Maintenance Engineering is a fourth year common second semester course.

Course codes and titles, credit hours and semester-by-semester layout of courses.

YEAR ONE SEMESTER ONE

Course Code	Course Title	T	P	C
MN 141	Basic French I	1	1	1
MN 151	Applied Electricity	2	2	3
MN 153	Linear Algebra and Trigonometry	2	2	3
MN 155	Technical Drawing	1	3	2
MN 157	Communication Skills I	2	1	2
MN 159	Introduction to Computing	1	2	2
MN 161	Physical and Structural Geology	2	1	2
MN 167	Basic Mechanics	2	2	3
	Totals	13	14	18

YEAR ONE SEMESTER TWO

Course Code	Course Title	T	P	C
MN 250	Mathematical Analysis	2	1	2
MN 252	Literature in English II	1	1	1
MN 254	Soil Mechanics	2	4	3
MN 256*	Field trip and Technical Report Writing I	1	1	1
MN 262	Land Surveying	2	4	3
MN 264	Fluid Mechanics	2	2	3
MN 270	Extractive Metallurgy	2	1	2
MN 272	Ground Fragmentation	2	2	3
MN 274	Alluvial and Ocean Mining	2	1	2
	Totals	16	17	20

* Field trips may be organised in either semester but the results shall be credited only at the end of the second semester.

4.1.11 Course Description

Provide short description of the content of the courses in the programme to include the following:

- Objective: indicate the set of knowledge and skills the student should have after the course;
- Content: indicate the facts, concepts, theories, principles and case studies that are taught and learned. This should not be more than six lines and are separated with a full stop (.) except where you have minor or sub topics. In case of a minor or sub topic, begin with a colon (:) and separate each sub topic with a comma(,);
- Mode of delivery: Indicate an appropriate mode of delivery for the course bearing in mind the student centred approach. Example: Lectures, Tutorials, Mini Project, Self-paced-scheduled, Experiential, Peer Tutoring, etc; and
- Reading materials: Indicate modern and/or recent relevant textbooks for the course. The minimum number of reading materials (textbooks) to be listed shall be Four (4). The date for the publication of such recommended textbooks to be used for each programme shall not be older than 5 years and, in exceptional case 10 years.

The following is an example of course description:

YEAR ONE SEMESTER ONE

MR 153 Linear Algebra and Trigonometry (2, 2, 3)

Objectives

This course is designed to introduce students to solve linear, quadratic, radical, exponential, logarithmic, polynomial and rational equations and inequalities; use matrix

operations to solve systems of equations and be able to determine the nature of the solutions; solve problems in complex numbers; use right triangle and oblique triangle problems, radian measure, graph circular functions and to solve trigonometric equations.

Content

Complex numbers: De Moivre's theorem and its application to (i) summation of series, (ii) expansion of $\text{Sinn}\theta$ and $\text{Cosn}\theta$ in double angles, (iii) expansion of $\text{Sinn}\theta$ and $\text{Cosn}\theta$ in terms of $\text{Sinn}\theta$ and $\text{Cosn}\theta$. Vector algebra and its applications. Introduction to matrix algebra and Spherical trigonometry.

Mode of Delivery

Lectures, Tutorials, Mini Project and Assignments.

Reading Material

- a. Beezer, R. A. (2012), A First Course in Linear Algebra, Congruent Press.
- b. Barry, P. D. (2001), Geometry with Trigonometry, Woodhead Publishing.
- c. Blyth, T.S. and Robertson, E.F. (2002), Basic Linear Algebra, Springer Undergraduate Mathematics Series.
- d. David, C.L (2012), Linear Algebra and Its Applications, 4th edition, Pearson.
- e. Sullivan, M. (2011), Algebra and Trigonometry Enhanced with Graphing Utilities (6th edition), Pearson.

YEAR ONE SEMESTER TWO

MN 250 Mathematical Analysis (2, 1, 2)

Objective

This course is designed to help students appreciate the use of various mathematical theorems, the convergent of series and parametric differentiation.

Content

Rolle's theorem. Mean value theorems. Taylor's theorem. Convergence of series. Power series. Taylor's series and Maclaurin's series. Indeterminate forms. Differentiation, parametric differentiation with application to plane curve.

Mode of Delivery

Lectures, Tutorials, Mini Project and Assignments.

Reading Material

- a. Fitzpatrick K. and Patrick, M. (2006), Advanced Calculus, 2nd Edition. Thomason Brooks/Cole 590 pp.

- b. Hennessy Robertson (2012), Handbook of Mathematical Analysis and Numerical Methods for Science and Technology, Auris Reference Ltd., UK.
- c. Stroud, K. A. (2001), Engineering Mathematics, 5th Edition. Palgrave. 1236 pp.
- d. Thomas, G. B., Finney, R. L., Weir M. D. (2000), Calculus with Analytic Geometry. Alternate Edition. Addition Wesley, Boston 946 pp.

4.1.12 Assessment of Students' Performance and Mode of Certification

Indicate the regulations on students' assessment, general assessment of the students, their performance, achievement and mode of certification taking into account the University policy on assessment and certification.

Example:

Assessment regulations

UMaT has two important booklets (listed below) which contain regulations on students' assessment. The booklets are given to each student.

- i. Conduct of Undergraduate Programmes: Policies, Code, Ethics and Regulations Vol. 2, No. 4 of 2015; and
- ii. Student Record Book.

General Assessment of Students

This involves written end of semester examinations, with minimum of two hours duration, to take 60% of total mark. Continuous assessments to cover remaining 40%. The continuous assessments may take the form of project report, essays, written examinations, homework, oral presentations and reports on industrial work experience.

a. Students' performance and achievement

Assessment of students involves:

- i. Continuous assessment made up of record of attendance to lectures (10%), exercises, quizzes and seminars (30%), summing up to 40%; and
- ii. End of semester examinations (60%).

b. Mode of certification

The mode of certification for a degree programme is determined by the following Cumulative Weighted Averages:

First Class	-	80% and above
Second Class (Upper)	-	70 – 79.99%
Second Class (Lower)	-	60 – 69.99%
Pass	-	50 – 59.99%
Fail	-	below 50%

The mode of certification for a diploma/certificate programme is determined by the following Cumulative Weighted Averages:

c. The certificate awarding institution

The University of Mines will award the student a degree/diploma/certificate and Technology (UMaT) after successful completion of his/her programme.

4.1.13 Resource Implications

Provide information on existing staffing situation, list of publications and technical report of staff, additional staff requirement, details of staff development plan, physical resources, source of funding for the new programme and linkages with other institutions.

(a) Existing Staff Situation

Information on staffing for the new programme shall be provided using the format shown in Table 1.

Table 1: Information on Staffing for the Programme

Staff Category	Name of staff	Sex	Full time	Part time	Highest qualification/Year obtained and Place	Area of specialisation	Rank/Years of teaching experience	Courses to be taught	Expected workload (expressed in hours per week per teacher)
Teaching staff									
Technical staff	Technologists:								
	Technicians:								
Administrative staff									

Support staff									

NB: High order ranks should be filled first after HoD's information

(b) List of Publications and Technical Reports of Staff

Provide a list of publications and Technical Reports of all staff in the Department using strictly the UMaT Referencing Style.

(c) Additional Staff Requirement

Provide details of additional staff needed to run the new programme

(d) Details of Staff Development Plan

Provide staff development plan (as contained in UMaT staff development policy) including but not limited to the following:

- i. Technical Assistance
- ii. Overseas training
- iii. Local training
- iv. Mentoring

(e) Physical Resources

Provide details of the available physical facilities needed to run the new programme including the following:

- i. classrooms, laboratories/workshops and their respective capacities
- ii. Pieces of equipment, instruments and tools
- iii. Provisions made for the physically challenged
- iv. Safety facilities provided
- v. Sources of information (e.g Library) and
- vi. Other relevant resources.

(f) Sources of Funding for the New Programme:

Specify and state the amount involved in funding the new programme in the following:

- i. External sources
- ii. Internal (specify and state amount)
- iii. Tuition/Academic Facility User Fees (Ghana cedis), if applicable
- iv. Cost-Benefit Analysis of the New Programme

(g) Linkages and Memoranda of Understanding (MOU) with other Institutions

Provide linkages with other organisations/institutions (national/international) for academic or other forms of support to the new programme, noting that UMaT has linkages and/or MoUs with the following institutions:

- i. Ghana Chamber of Mines
- ii. Mineral Commission
- iii. Nexans Kabelmetal Ghana
- iv. Total Petroleum Ghana Limited
- v. Kristo Asafo Technology Centre
- vi. Japan Motors Trading Company
- vii. Mantrack Ghana Limited
- viii. Orica Ghana Limited
- ix. Air Liquide Ghana Limited
- x. University of South Australia, Australia
- xi. University of Port Harcourt, Nigeria
- xii. Montana Tech of the University of Montana, Butte, Montana. USA
- xiii. Memorial University of Newfoundland, Canada.
- xiv. African Renaissance Institute of Science and Technology, New Jersey, USA
- xv. Federal University of Technology, Owerri, Nigeria
- xvi. The Federal University of Technology, Akure, Nigeria
- xvii. World Forum of Universities of Resources on Sustainability, Freiberg, Germany
- xviii. University of Ibadan, Ibadan, Nigeria
- xix. Universita' Politecnica Delle Marche, Italy
- xx. Cuttington University, Suakoko, Liberia

4.1.14 Student Enrolment Plan

Provide projected student enrolments for the next five (5) years in Table 2 taking into consideration UMaT Policy on enrolment and the following NAB norms:

- a. New Entrants
 - i. Male: Female Participation = 50:50
 - ii. Science: Social Science and Humanities = 60:40
 - iii. Postgraduate enrolment = 25% of total enrolment
 - iv. Quota of international students = 10%
 - v. Quota of fee-paying students = 5%
 - vi. Quota of students from disadvantaged secondary schools = 5%
- b. Growth Rates in Enrolments for Established Public Universities
 - i. Humanities/Business = 4%
 - ii. Science and Technology = 6%
 - iii. Postgraduates = 25%

Table 2: Projected Enrolment

Academic Year	Year 1	Year 2	Year 3	Year 4	Year 5
Male					
Female					
Total					

4.1.15 References

A list of reference materials consulted in developing the new programme shall be provided using the UMaT referencing style.

4.2 Information for Review of Existing Programme Approval

In order to review an existing programme at UMaT, the following format shall be used:

4.2.1 Title Page

Provide the following for the title page:

- a. Name of Institution: University of Mines and Technology, (UMaT), Tarkwa
- b. Programme Title: Petroleum Engineering
- c. Level of Programme: Bachelor of Science (BSc)
- d. Date of 1st Accreditation of the Programme by NAB, Ghana: 1 September 2010
- e. Date of Last Accreditation of the Programme by NAB, Ghana: 1 September 2010
- f. Name of the Mentoring Institution to which Programme is Affiliated: N/A
- g. Proof of Programme Affiliation to the Mentoring Institution: N/A

4.2.2 Title and Level of Programme

Provide the title and level of the review programme. Example:

- a. Name of Institution: University of Mines and Technology, (UMaT), Tarkwa
- b. Programme Title: Petroleum Engineering
- c. Level of Programme: Bachelor of Science (BSc)
- d. Date of 1st Accreditation of the Programme by NAB, Ghana: 1 September 2010
- e. Date of Last Accreditation of the Programme by NAB, Ghana: 1 September 2010
- f. Name of the Mentoring Institution to which Programme is Affiliated: N/A
- g. Proof of Programme Affiliation to the Mentoring Institution: N/A

4.2.3 History of Programme

Provide brief historical background of the programme of study (i.e. how the programme has developed over the years since it started).

For example:

The Petroleum Engineering Department was commissioned in 2009 to run a 4-year Bachelor's degree programme in Petroleum Engineering to provide manpower for

the new oil and gas industry of Ghana. The department has consistently admitted both local and foreign students, and turned out its first batch of graduates since 2013. The department has graduated 99 students to date who are servicing the country in many various ways.

4.2.4 Department/School Offering Programme

Provide the following information on the Department offering the programme: for example:

- a. Name of Unit: Faculty of Mineral Resources Technology/Department of Petroleum Engineering.
- b. Name and Qualification of the Head: Grace Ofori-Sarpong (PhD)

4.2.5 Support and Consultations

Support: Provide a statement indicating that the proposed review programme has the support and approval of the Departmental Board.

Example: The Departmental Board, at its 11th (Regular) meeting held on 20th January, 2013, considered and recommended for approval a review of BSc Programme in Petroleum Engineering. I therefore forward the document for consideration by the Faculty Board.

Consultations: Provide a statement indicating the level of consultations with academic institution(s), appropriate professional and/or relevant industrial group(s).

Example: The Department has consulted and included the comments of the Ghana National Petroleum Corporation, Ghana Institution of Engineers, Petroleum Commission, Society of Petroleum Engineers and University of Port Harcourt, Nigeria. The comments are attached as SP1 for your perusal and consideration.

4.2.6 Rationale for the Review

Provide a statement indicating the rationale for the proposed review of the programme. For example: The Petroleum Engineering Department was commissioned in 2009 to run a 4-year Bachelor's degree programme in Petroleum Engineering. The department has consistently admitted both local and foreign students, and turned out the first batch of graduates in 2013. Having tested the programme content for 4 years, and taking cognisance of the very dynamic nature of the Petroleum Industry all over the world, the department initiated a review process to accommodate the new trends in petroleum exploitation.

4.2.7 Aims and Objectives of the Programme

Provide a statement indicating the aims and objectives of the programme as it fit into the mission, vision and core values of the University as well as the National demand

for the programme. For example: The BSc Petroleum Engineering Programme aims at providing firm grounding in concepts of Petroleum Engineering disciplines and related courses to reflect the sophisticated and fast-evolving technologies employed in petroleum exploitation. It is also to meet the requirements of the Ghanaian and international petroleum and allied industries. The main objectives are to:

- i. train competent first degree graduates;
- ii. prepare first degree graduates to take up jobs in the petroleum and allied industry; and
- iii. prepare candidates for higher degrees in petroleum and related programmes.

4.2.8 Student Learning Outcomes for the Programme

Provide a statement/list indicating the student learning outcomes for the programme. This must show the set of knowledge and skills a graduate of the programme should have and must be in line with the graduate learning output of the Faculty and the University. For example: The thematic areas of the Petroleum Engineering programme are the following;

- a. Drilling Engineering
- b. Reservoir Engineering
- c. Production Engineering
- d. Petroleum Economics
- e. Environment, Health and Safety
- f. Soft Skill

At the end of the programme, graduates should be able to do the following under the thematic areas.

a. Production Engineering

- i. Describe and design basic surface and subsurface production equipment for oil and gas reservoirs and manage production facilities.
- ii. Describe fluid flow performance profile from the reservoir to surface; and fluid
- iii. processing, transportation and storage.
- iv. Diagnose and prescribe remediation measures for production problems.

b. Reservoir Engineering

- i. Characterise petroleum reservoirs and reservoir fluids; explain rock-fluid interactions; estimate reserves, discuss reservoir drive mechanisms; and predict future reservoir performance.
- ii. Describe and estimate fluid flow in porous media; discuss petroleum recovery methods; and apply reservoir engineering principles for optimal field development.

c. Petroleum Economics

- i. Discuss the factors affecting energy demand and supply; analyse the operation of the physical and financial oil markets; and discuss world petroleum fiscal regimes.
- ii. Discuss profitability indicators and investment decision making tools; evaluate the economic viability of petroleum investment opportunities and quantify risk and uncertainty.

d. Soft Skills

- i. Apply critical thinking to identify, formulate, analyse and solve engineering problems in a global, societal, and economic context.
- ii. Communicate effectively by written, and verbal; and demonstrate computing skills necessary for everyday work of an engineer.
- iii. Acquire professional and ethical responsibility and engage in lifelong learning

e. Environmental, Health and Safety

- i. Identify the sources of petroleum wastes and their management and describe the proactive approach to managing operations.
- ii. Recognise the need for Environment, Health and Safety (EHS) regulations and compliance; identify, assess petroleum related health and safety issues and describe their control.

f. Drilling Engineering

- i. Identify and describe the various drilling methods, types, operations, controls and equipment.
- ii. Design and manage drilling programmes (drilling fluids, cement slurries, casing, drilling assembly (BHA), etc.) for efficient wellbore management.

4.2.9 Date of Commencement of the Review Programme

Indicate the academic year that the review shall be implemented.

For example: Adoption and teaching of the reviewed course content is intended to start at the beginning of the 2017/2018 Academic Year with the fresh students.

4.2.10 Students' Admission, Progression and Graduation Requirements

Indicate the minimum qualifications for admission into the programme, progression and graduation requirements.

Admission requirements

Indicate the minimum requirement for applicants with the following qualifications:

SSCE candidates: Candidates must have credit passes (A-D) in THREE CORE SUBJECTS in English Language, Mathematics and Integrated Science and passes in THREE SCIENCE ELECTIVES in Physics, Chemistry and Mathematics.

WASSCE candidates: Candidates must have passes (A1-C6) in THREE CORE SUBJECTS in English Language, Mathematics and Integrated Science and passes in THREE SCIENCE ELECTIVES in Physics, Chemistry and Mathematics.

GCE advanced level candidates: Candidates must have passes in THREE (3) SUBJECTS (at least, one of the passes should be Grade D or better). Also, the applicant must have had credits passes (Grade 6) in five (5) GCE ORDINARY LEVEL subjects including English, Mathematics and an Arts subject for science students.

Mature candidate: Candidates must have attained 25 years of age and must have passes in FIVE SUBJECTS at SHS LEVEL including English Language and Mathematics or credits in FIVE SUBJECTS at GCE ORDINARY LEVEL including English Language and Mathematics. In addition, candidates must have relevant working experience and must pass an interview conducted by the Department.

Foreign Applicants: Applicants with international Baccalaureate in science are eligible to apply. Such applicants must also possess a proficiency certificate in English. Please note that all certificates should be translated into English. Equivalences with regard to the certificates would be sought at the National Accreditation Board.

Progression

Provide the Credit, and any additional programme requirements for progression.

Example: course registration, lectures, field trips, industrial attachments, participation in continuous assessment and end of semester examinations.

Graduation Requirements

Indicate the Course, Credit, and any additional requirements for graduation.

Example:

a. Course Requirements

i. Pass all required courses

ii. Submit reports on all fieldtrips and industrial attachments

iii. Achieve a cumulative weighted average mark of 50% or above

iv. Complete a supervised project work in the final year

b. Credits Requirements

Achieve a minimum of 148 credits

c. Any additional requirements for graduation

i. A student shall be deemed to have satisfied the requirements for graduation, if:

ii. He/she has satisfied all Department and Faculty requirements;

iii. He/she has accumulated the minimum number of credits by the Faculty, including core and prescribed electives.

4.2.11 Employment

A List of all the areas in which the graduates are likely to be employed shall be provided. For example, universities and educational institutions, mining, mineral, petroleum and allied industries, etc.

4.2.12 Components of the Programme

Provide details of the curriculum in a tabular form to include the following:

- a. Course Code
- b. Course Title
- c. Credit Hours
- d. Research Component
- e. Practical Training, Fieldtrips, Industrial Attachment, etc

NB: The Course Coding Philosophy at UMaT indicated here must be followed:

- i. Alphabets: Department
- ii. 1st digit: Year of study
- iii. 2nd digit: 1-4 for sub-degree programmes
5-6 for common courses
7-9 for departmental courses
- iv. 3rd digit: Odd number for 1st semester
Even number for 2nd semester

Example: Course codes and titles, credit hours and semester-by-semester layout of courses.

Year One Semester One

Course Code	Subject	T	P	C
CE 141	Basic French I	1	1	1
CE 151	Applied Electricity	2	2	3
CE 155	Technical Drawing	1	3	2
CE 157	Communication Skills I	2	1	2
CE 163	Procedural Programming with C++	1	4	2
CE 167	Basic Mechanics	2	2	3
CE 169	Linear Algebra	2	2	3
CE 171	Introduction to Computer Science and Engineering	2	2	3
Totals		13	17	19

Year One Semester One

Course Code	Subject	T	P	C
CE 142	Basic French II	1	1	1
CE 156	Engineering Drawing	2	2	3
CE 158	Communication Skills II	2	1	2
CE 162	Circuit Theory	2	2	3
CE 164	Basic Electronics	2	2	3
CE 166	Calculus	2	2	3
CE 172	Digital Electronics	2	1	2
Totals		13	11	17

* Fieldtrips may be organised in either semester but the results shall be credited only at the end of the second semester.

4.2.13 Course Description

Provide short description of the content of the courses in the programme to include the following:

- a. Objective: indicate the set of knowledge and skills the student should have after the course
- b. Content: indicate the facts, concepts, theories, principles and case studies that are taught and learned. This should not be more than six lines and are separated with a full stop (.) except where you have minor or sub topics. In case of a minor or sub topic, begin with a colon (:) and separate each sub topic with a comma (,).
- c. Mode of delivery: Indicate an appropriate mode of delivery for the course bearing in mind the student centred approach. Example: Lectures, Tutorials, Mini Project, Self-paced-scheduled, Experiential, Peer Tutoring, etc.
- d. Reading materials: Indicate modern and/or recent relevant textbooks for the course. A minimum of three (3) and maximum of five (5) current textbooks are to be listed.

The following is an example of course description:

YEAR THREE SEMESTER TWO

EL 352 Public Relations (2, 0, 2)

Objective

This course is intended to teach students the art of Public relations (PR) and the practice of managing the flow of information between an individual or an organization and the public.

Content

Scope and importance of Public Relations (PR): the business of PR, definitions of PR, the publics of PR; PR distinguished from other forms of communication; the five images in PR; the qualities of a good PR officer. Planning PR programmes: the four reasons for planning PR programmes; the six-point planning model; the PR transfer process. The PR department; the size of PR department; the PR consultant and manager. The news media; the created private media; press relations. PR in developing countries. Crisis management PR.

Mode of Delivery

Lectures, Tutorials, mini project and Assignments

Reading Material

- a. Distaso M. W. (2014), Ethical Practice of Social Media in Public Relations, Routledge
- b. Bowen, S. A. (2010), An Overview to the Public Relations Function, Business Expert Press
- c. Fitzpatrick, K. R. (2006), Ethics in Public Relations: Responsible Advocacy, Sage Publications

YEAR FOUR SEMESTER TWO

PE 459 Operations Research (2, 2, 3)

Objective

This course is aimed at helping students in the discipline that deals with the application of advanced analytical methods to help make better decisions.

Content

Application of the following operations research techniques in solving relevant problems: Linear and integer programming. Assignment and transportation problems. Decision analysis. Project scheduling methods: CPM, PERT. Simulation techniques. Application of appropriate computer software.

Mode of Delivery

Lectures, Tutorials, mini project and Assignments

Reading Material

- a) Whitt, M. D., (2012), Successful Instrumentation and Control Systems Design, ISA.
- b) Horddeski, M., (2009), Control and Instrumentation Technology in Hvac: PCs and Environmental Controls, Prentice Hall.
- c) Bolton, W. (2004), Instrumentation and Control Systems, Newnes.
- d) Dunn, W., (2005), Fundamentals of Industrial Instrumentation and Process Control, McGraw-Hill Professional.

4.2.14 Assessment of Students' Performance and Mode of Certification

Indicate the regulations on students' assessment, general assessment of the students, their performance, achievement and mode of certification taking into account the University policy on assessment and certification.

Example:

Assessment regulations

UMaT has three important booklets (listed below) which contain regulations on students' assessment. The booklets are given to each student.

- i. The Student Guide. UMaT Recorder Vol. 2, No. 3 of 2015;
- ii. Conduct of Undergraduate Programmes: Policies, Code, Ethics and Regulations Vol. 2, No. 4 of 2015; and
- iii. Student Record Book.

General Assessment of Students

This involves written end of semester examinations, with minimum of two hours duration, to take 60% of total mark. Continuous assessments to cover remaining 40%. The continuous assessments may take the form of project report, essays, written examinations, homework, oral presentations and reports on industrial work experience.

a. Students' performance and achievement

Assessment of students involves:

- i. Continuous assessment made up of record of attendance to lectures (10%), exercises, quizzes and seminars (30%), summing up to 40%; and
- ii. End of semester examinations (60%).

b. Mode of certification

The mode of certification for a degree programme is determined by the following Cumulative Weighted Averages:

First Class	-	80% and above
Second Class (Upper)	-	70 – 79.99%
Second Class (Lower)	-	60 – 69.99%
Pass	-	50 – 59.99%
Fail	-	below 50%

The mode of certification for a diploma/certificate programme is determined by the following Cumulative Weighted Averages:

c. The certificate awarding institution

The University of Mines and Technology (UMaT) will award the student a degree/diploma/certificate after successful completion of his/her programme.

4.2.15 Changes in Curriculum

Provide a list of changes made in the curriculum and/or mode of delivery since the programme was last approved by Academic Board and/or accredited by NAB.

4.2.16 Resource Implications

Provide information on existing staffing situation, list of publication and technical report of staff, additional staff requirement, details of staff development plan, physical resources, source of funding for the review programme and linkages with other institutions.

4.2.17 Existing Staff Situation

Provide information on staffing for the review programme using the example shown in the Table 2 on the next page.

Table 2: Information on Staffing for the Programme

Staff Category	Name of staff	Sex	Full time	Part time	Highest qualification/ Year obtained and Place	Area of specialisation	Rank/ Years of teaching experience	Courses to be taught	Expected workload (expressed in hours per week per teacher)
Teaching staff									
Technical staff	Technologists:								
	Technicians:								
Administrative staff									

Support staff									

NB: High order ranks should be filled first after the HoD's information

4.2.18 List of Publications and Technical Reports of Staff

Provide a list of publications and Technical Reports of all staff in the Department using strictly the UMaT Referencing Style.

4.2.19 Additional Staff Requirement

Provide details of additional staff needed to run the review programme

4.2.20 Details of Staff Development Plan

Provide information on proposed staff development programme to replace staff, to upgrade staff and/or improve competence of staff including but not limited to the following:

- a. Technical assistance.
- b. Overseas training.
- c. Local training.
- d. Mentoring.
- e. Funding plan for the execution of the above staff development programme.
- f. Acquisition of special skills

4.2.21 Physical Resources

Provide details of physical facilities in place including the following:

- a. Numbers of available classrooms, teaching staff offices, laboratories/workshops and their respective capacities
- b. Numbers of available pieces of equipment, instruments and tools (specifying functional and non-functional ones).
- c. Provisions made for the physically challenged.
- d. Safety Measures.

4.2.22 Financial Resources

Provide the following information on the programme's finances:

- a. Annual budget details for the programme against actuals received for the previous, current and next academic years against the operational and Capital Expenditure items in table 3:

Table 3: Programme Budget

Items	Amount in GHS					
	Previous Year		Current Year		Next Year	
	Budget	Actual	Budget	Actual	Budget	Actual
Equipment						
Maintenance						
Consumables (Office)						
Consumables(Labs, Workshops etc)						
Others (e.g. Research Funds)						
Total						

b. Initial capitalisation and total annual expenses over the past three (3) years.

c. Sources for meeting programme's financial requirements:

- i. Contributions from income generation activities.
- ii. Endowment Fund.
- iii. Level of fees (in Ghana cedis).
- iv. Grants and donations.
- v. Government of Ghana funding.
- vi. Other sources (please specify).

4.2.23 Linkages and Memoranda of Understanding (MOU) with other Institutions

Provide linkages with other organisations/institutions (national/international) for academic or other forms of support to the new programme, noting that UMaT has linkages with the following institutions:

- a. Ghana Chamber of Mines
- b. Mineral Commission
- c. Nexans Kabelmetal Ghana
- d. Total Petroleum Ghana Limited
- e. Kristo Asafo Technology Centre
- f. Japan Motors Trading Company
- g. Mantrack Ghana Limited
- h. Orica Ghana Limited
- i. Air Liquide Ghana Limited
- j. University of South Australia, Australia
- k. University of Port Harcourt, Nigeria
- l. Montana Tech of the University of Montana, Butte, Montana. USA

- m. Memorial University of Newfoundland, Canada.
- n. African Renaissance Institute of Science and Technology, New Jersey, USA
- o. Federal University of Technology, Owerri, Nigeria
- p. The Federal University of Technology, Akure, Nigeria
- q. World Forum of Universities of Resources on Sustainability, Freiberg, Germany
- r. University of Ibadan, Ibadan, Nigeria
- s. Università Politecnica Delle Marche, Italy
- t. Cuttington University, Suakoko, Liberia

4.2.24 Student Enrolment Plan

Provide data on the following:

- a. Total student enrolment for all years of the programme for the current and past two (2) years in table 3:

Table 3: Total Enrolment for the Programme

Year	Current Year (20__)			Past 1 Year			Past 2 Years		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Year 1									
Year 2									
Year 3									
Year 4									
Grand Total									

4.2.25 Data for Staff/Student Ratio (SSR)

Provide current data on staff and students for the Unit in Table 4

Table 4: Staff/Student Ratio

UNIT	TOTAL NO. OF TEACHING STAFF		TOTAL NO. OF STUDENTS		STUDENT/ STAFF RATIO (SSR)= (Total # of Students FT staff + *FTE staff)
	Full-Time (FT)	Part-Time (PT)	Full-Time (FT)	Part-Time (PT)	

- NB:**
- 1. Part-time Student: Any student doing less than 15 hours per workload per week
 - 2. *Full-Time Equivalent (FTE): 3 Part-Time (PT) teaching staff (lecturers) = 1 Full-Time (FT) teaching staff (lecturer)

4.2.26 Student Work Load

State the student workload (in credit hours) per week for each semester.

For example:

Semester	Work load (Credit)		
	Teaching	Practical	Credit
1	13	14	18
2	17	11	19
3	15	14	19
4	15	15	19
5	13	12	18
6	13	17	19
7	13	11	18
8	11	16	16

4.2.27 Graduate Output to Date

Provide data on graduate output in the past three years of the programme

Table 5: Number of Graduates Produced per Year in the past three years

	Past Year (20__)	Past two years (20__)	Past three years (20__)
Male			
Female			
Total			

Graduate-output by class:

Table 6: Performance Range of Graduates

CLASSIFICATION	Past Year	Past 2 Years	Past 3 Years
1st Class			
2nd Class Upper			
2nd Class Lower			
Pass			
Total			

4.2.28 Development since Last Accreditation

Outline developments in the programme (if any) since it was last accredited by NAB (e.g. partnerships, new additions to facilities, staffing increase or decrease, library stock increases specific to the programme, funding opportunities, scholarships, funded projects/research opportunities, publications, exchange programmes etc).

4.2.29 NAB Recommendations Implemented

List all NAB recommendations from the last accreditation exercise on the programme and outline the degree of implementation of each of the recommendations by the Department.

4.2.30 References

Provide a list of materials consulted in developing the review programme using the UMaT referencing style.

4.3 Format for Introducing a New Course

Any Staff/Department/Faculty that intends to introduce a new course at UMaT shall complete this form:

UNIVERSITY OF MINES AND TECHNOLOGY (UMaT), TARKWA
Form for Introducing a New Course

Submitted By: Date:
Department: Faculty:
Course Title:
Course Code: *(Please apply UMaT coding philosophy)*
Teaching: Practical/Tutorial: Credits:
Proposed Start Date:

Rationale: Why is this request being made?

.....
.....
.....

Prerequisites (if any)

.....
.....
.....

Course Objectives (the set of knowledge and skills the student should have after the course)

.....
.....
.....

Course Content (The facts, concepts, theories, principles and case studies that are taught and learned. This should not be more than six lines and are separated with a full stop (.) except where you have minor or sub topics. In case of a minor or sub topic, begin with a colon (:) and separate each sub topic with a comma (,))

.....

.....

.....

Mode of Delivery (Indicate an appropriate mode of delivery for the course bearing in mind the student centred approach. Example: Lectures, Tutorials, Mini Project, Self-paced-scheduled, Experiential, Peer Tutoring etc)

.....

.....

.....

Reading Materials (Indicate modern and/or recent relevant textbooks for the course. A minimum of three (3) current textbooks are to be listed)

.....

.....

.....

Student Learning Outcomes (Must be measurable and use action verbs)

.....

.....

.....

Explain how this course proposal will affect other departments/programmes

.....

.....

.....

Explain how this course proposal will affect existing semester work load per week

.....

.....

.....

Logistics needed

.....

.....

.....

Submission Checklist

.....Electronic course content submitted along with this form to Department/Faculty

.....Course Content Description meets required UMaT format

.....Researched effect of change on other programmes, and semester work load per week

SIGNATURES

PERSONNEL	SIGNATURE	DATE
Instructor:		
Head of Department: I verified change with impacted Department(s). Date considered at Board meeting:		
Dean of Faculty Board (Comments): Date considered at Faculty:		
Dean PQAU (Comments):		

4.4 Format for Reviewing Existing Course

Any staff/Department/Faculty that intends to review an existing course at UMaT shall complete this form:

UNIVERSITY OF MINES AND TECHNOLOGY (UMaT), TARKWA

Form for Reviewing Existing Course

Submitted By: Date:

Department: Faculty:

Course Title:

Course Code:*(Please apply UMaT coding philosophy)*

TPC: Teaching:..... Practical: Credits:.....

Review Effective Date:

Rationale: Why is this request being made?

.....

.....

.....

What is changing? (Tick (√) all that apply and complete appropriate sections on the form for explanatory purposes)

Course Title		Reading Materials	
Course Code		Student Learning Outcomes	
Course Content		TPC	
Course Objectives		Other	

Credits: Current: Teaching:_____ Practical:_____ Credits:_____

Proposed: Teaching:_____ Practical:_____ Credits:_____

Course Title:

Current: _____

Proposed: _____

Prerequisites: (if any)

Current: _____

Proposed: _____

Course Objectives if changed (the set of knowledge and skills the student should have after the course)

.....

Course Content if changed (This is the facts, concepts, theories, principles and case studies that are taught and learned. This should not be more than six lines and are separated with a full stop (.) except where you have minor or sub topics. In case of a minor or sub topic, begin with a colon (:) and separate each sub topic with a coma (,))

.....

Mode of delivery if changed (Indicate an appropriate mode of delivery for the course bearing in mind the student centred approach. Example: Lectures, Tutorials, Mini Project, Self-paced-scheduled, Experiential, Peer Tutoring, etc.)

.....

Reading Materials if changed (Indicate modern and/or recent relevant textbooks for the course. A minimum of three (3) current textbooks are to be listed)

Student Learning Outcomes if changed (Must be measureable and use action verbs)

.....

Explain how this course review will affect other departments/programmes

.....

Explain how this course review will affect existing semester work load per week

.....

Other Modifications

.....
.....
.....

Logistics needed

.....
.....
.....

Submission Checklist

..... Electronic course content submitted along with this form to Department/Faculty

..... Course Content Description meets required UMaT format

..... Researched effect of change on other programmes, and semester work load per week

SIGNATURES

PERSONNEL	SIGNATURE	DATE
Instructor:		
Head of Department: I verified change with impacted Department(s). Date considered at Board meeting:		
Dean of Faculty Board (Comments): Date considered at Faculty:		
Dean PQAU (Comments):		

4.5 Format for Retiring a Course

Any staff/Department/Faculty that intends to retire an existing course at UMaT shall complete this form:

UNIVERSITY OF MINES AND TECHNOLOGY (UMAT), TARKWA Form for Reviewing Existing Course

Submitted By: Date:

Department: Faculty:

Course Title:

Course Code: (Please apply UMaT coding philosophy)

TPC: Teaching: Practical: Credits:

Review Effective Date:

Rationale: Why is this request being made?

.....
.....
.....

Explain how this course retirement will affect other departments/programmes

.....

Explain how this course retirement will affect existing semester work load per week

.....

SIGNATURES

PERSONNEL	SIGNATURE	DATE
Instructor:		
Head of Department: I verified change with impacted Department(s). Date considered at Board meeting:		
Dean of Faculty Board (Comments): Date considered at Faculty:		
Dean PQAU (Comments):		

5 CHECKLIST FOR CURRICULUM APPROVAL WITHIN UMaT

The following checklist for the Department/Faculty/Academic Board shall be used within UMaT:

5.1 Checklist for the Department

Check that:

- a. the justification for introducing or reviewing the course/curriculum is clearly stated and can be defended.
- b. the programme can be accommodated within the vision and mission of UMaT.
- c. the relevance of the programme to national development has been stated.
- d. the title of the programme reflects the content.
- e. general engineering foundation courses have been included.
- f. course codes reflect the standards for single and combined courses.
- g. TPCs have been correctly assigned.
- h. total credits per semester are between 16 and 21, and number of courses is between 5 and 9.
- i. detailed course content is within 4-6 lines.
- j. learning outcomes have been added to each course content.
- k. three to five (3-5) references have been added in the right format.
- l. stakeholder (students, alumni, academia, industry) inputs have been considered.
- m. UMaT format has been followed.
- n. the draft programme has been considered and approved at the board meeting of the department concerned.

5.2 Checklist for the Faculty

In addition to the departmental checklist, check that the draft programme has been considered and approved at the board meeting of the Faculty concerned.

5.3 Checklist for the Academic Board

In addition to the Faculty checklist, check that the draft programme has been considered and approved by the Academic Board.

6 CHECKLIST FOR CURRICULUM APPROVAL OUTSIDE UMaT

6.1 National Council for Tertiary Education

New programmes are required to receive approval by the National Council for Tertiary Education (NCTE) before they are prepared for accreditation by the National Accreditation Board. The NCTE guidelines seek to ensure the alignment of new programmes with national development, the institution's mission and vision, and the source of funding for the programmes, among others. The NCTE document is attached as Appendix D. The checklist for NCTE guidelines are as follows:

- a. The programme has been aligned with the Mission and Vision of the Institution as per its mandate by law.
- b. Objectives and intended outcomes of the new programme are clearly stated.
- c. The knowledge, skills and competencies that would be acquired by students after graduation are clearly addressed.
- d. National development objectives are clearly considered and addressed.
- e. The skill needs of the institution's "catchment area" and those of the government have been addressed.
- f. The inadequacies in skills in a particular sector, and how the programme can address the problem have been demonstrated.
- g. Uniqueness of the programme in comparison with others run by other institutions has been clearly demonstrated.
- h. Prospective students who can access the programme have been identified.
- i. Sectors of the economy that are potential employers of graduates have been identified.
- j. Projections of enrolments for the new programme for the first five years have been made.
- k. The current staffing position, projections on teaching and support staff and student/staff ratios for the first five years have been incorporated.
- l. List of staff who would participate in the new programme have been attached.
- m. The cost implications of the new programme for the first five years have been analysed, and mode of funding clearly demonstrated.
- n. The recurrent and capital costs associated with the new programme as against streams of expected income have been assessed.
- o. Sustainability of funding for the programme has been clearly demonstrated.

6.2 National Accreditation Board

The following procedure shall be used to prepare for accreditation by the National Accreditation Board (NAB):

- a. The Department concerned shall write to the Vice Chancellor through the Dean of the Faculty to request for accreditation or re-accreditation.
- b. The Department shall visit the website of the NAB (www.nab.gov.gh) and download the appropriate NAB pack.c. The Department shall assemble documents that contain the following in a conference room:

New Programme

- a. Academic Matters: Programme Aims and Objectives, the Curriculum, Admission Requirements, Qualifications of Students, Projected Enrolment Statistics, Academic Regulations, Internal Course Assessment, Mandatory Courses, Peer and Professional Assessment of Content of Teaching
- b. Examination: Policy on Internal and External Moderation of Examinations, External Examination System and Marking of Scripts
- c. Staffing: Detailed Employment Letters, Acceptance Letters, and Proof Verification of Claimed Qualifications for All Senior Staff and Faculty, Detailed Qualifications of Head of Department, List of Proposed Teaching Staff, Non-Teaching Staff-Administrative And Technical Support Staff, Staff Development Policy
- d. Physical Facilities: Laboratories and Equipment, Classroom Facilities, Space Utilization Of Academic Facilities, Safety, Health And Environmental Sanitation
- e. Library Facilities: Textbooks, Journals, General Books and Other Resources Materials For The Programme
- f. Fees: Level of Fees To Be Paid, Endowment Fund And Source Of Inflows
- g. Policy on Ethics for Staff and Faculty: Affirmative Action; Research And Publications; Grievance Resolutions

Existing Programme

- a. Academic matters: Programme Aims and Objectives, the Curriculum, Admission Requirements, Student Files For Students Admitted During The Last Years, Qualifications of Students, Use of Admission Requirements (Files of Admitted Students For Current Year), Actual Enrolment Statistics By Year Of Study, Programme, Sex, For The Last Three (3) Years, Projected Enrolment Statistics, Academic Regulations, Practical Work Or Fieldtrips, Supervised Industrial Attachment, Mandatory Courses, Student Assessment of Course Content And Teaching, Peer And Professional Assessment of Content of Teaching.
- b. Examination: Examination Questions, Students' Marked Papers, Marking Schemes, Standard of Questions, Marking Scheme, Project Work, Internal and External Moderation of Examinations.

- c. Staffing: Detailed Employment Letters, Acceptance Letters, and Proof Verification of Claimed Qualifications Of All Senior Staff And Faculty, Teaching Staff- Full Time And Part-Time, Teaching Load, Student/ Staff Ratio, Detailed Qualifications of Head of Department, Details of Non-Teaching Staff , Staff Development Policy.
- d. Physical Facilities: Laboratories and Equipment, Classroom Facilities, Space Utilization Of Academic Facilities, Safety, Health And Environmental Sanitation.
- e. Library Facilities: Textbooks, Journals, General Books and Other Resources Materials For The Programme.
- f. Employers Rating of Graduates: Supervised Industrial Works Experience, Vacation Training, Adequacy of Programme In Relation To Job, Tracer Study of Status of Graduates.
- g. Funding: Funding of The Programme, Level of Fees, Endowment Fund And Sources of Inflow, Details of Banks Accounts.
- h. Policy on Ethics for Staff and Faculty; Affirmative Action; Research And publications; Grievance Resolutions.

7 WRITING LEARNING OUTCOMES

The content and delivery of courses in all academic disciplines are prerequisite and fundamental. Both the lecturer and the student have a common document to work with – the lecturer to teach what is in the curriculum/programme/course; and the student to learn what is delivered by the lecturer. It is also an area that enables both constituents to assess each other in an objective manner. Learning outcomes should be aligned to the vision and mission of the department concerned, and ultimately to UMaT.

7.1 Course Purpose and Outline

The philosophy of the programme(s) underpin(s) all course(s) that the institution offers. Keeping the following thoughts in mind will help write a good course objective, outline, and thereby guide in the formulation of LOs:

- i. The reason for mounting the course;
- ii. How the course fits into other courses, programme, and vision of the University;
- iii. How unique this aspect of the course is;
- iv. Why students should take it;
- v. What essential knowledge/skills will be gained from the course.

7.2 Learning Outcomes

The Learning Outcome (LO) (also referred to as Expected Learning Outcome) is a formal statement of what students are expected to learn in a course as formulated by the course description and purpose. It is meant to help students connect the dots after taking a course. Writing LOs are dependent on the course purpose and outline spelt out and need to be clearly set out. They also determine how the course will be as-

essed or how students will be evaluated. LOs give a more student-centred approach to teaching; focused on the outcome of the teacher-student interaction. In essence, LOs are statements of what a learner is expected to know, understand, and/or be able to demonstrate after completion of a process of learning (Kennedy et al, 2006). LOs should be clear, succinct/concise and in simple language – in Behavioral, Observable, Measureable and Specific (BOMS) terms of the course and lesson taught. They usually are adjectives that follow the BOMS acronym and use concrete words.

Examples of LOs are:

- i. At the end of the course, students should be able to design a simple machine;
- ii. By the end of the semester, students should be able to identify and describe different equipment used in the processing of crude oil;
- iii. By the end of the lesson, students should be capable of organising and re-arranging and labelling the different parts of a machine;
- iv. At the end of the course, students should exhibit a more friendly behaviour to disposing waste.

Bloom’s taxonomy in the cognitive domain of educational objectives has been widely used as a guideline to writing LOs. It is hierarchical in nature, noting that one can build on prior learning to develop complex levels of understanding. Below is an extract from Bloom’s theory with examples of verbs to use in LOs guided by BOMS:

Hierarchy of Cognitive Domain	• Recommended Verbs to Use in Learning Outcomes
Level 1: Knowledge	• Arrange, collect, define, examine, describe, order, outline, relate, repeat, tabulate, recollect, recognise, show.
Level 2: Comprehension	• Change, clarify, classify, construct, discuss, explain, rewrite, review, recognise, report, solve, differentiate.
Level 3: Application	• Apply, calculate, complete, compute, construct, produce, transfer, use, illustrate, modify, modify, choose, examine.
Level 4: Analysis	• Arrange, break down, calculate, ategonise, compare, connect, outline, distinguish, experiment, relate, contrast, infer, point out.
Level 5: Evaluation	• Argue, assess, choose, conclude, grade, defend, discriminate, evaluate, judge, rate, recommend.

Figure 1: Culled from Bloom’s Taxonomy (Kennedy et al., 2006)

7.3 Teaching and Learning Activities

Lessons can be delivered by different methods and include lectures, tutorials, discussions, seminars, group work, laboratory work, and group presentations, depending on, among other things, the nature of the course and the size of the class.

7.4 Assessing Learning Outcomes

The lecturer's job is not completed until he/she has assessed the student. It is also an indirect assessment of the lecturer. To do this, the lecturer needs to develop an Assessment Plan which should cover the following, bearing in mind the size of the class and the nature of the course:

- i. What should be assessed;
- ii. Logistics and equipment needed;
- iii. Who to assess;
- iv. When to assess;
- v. How to assess.

Methods of assessment are usually dictated by the course and how it was delivered and the size of the class. It is underpinned by the Course Objective. The lecturer has to choose the most appropriate and expedient method, and when to use it. Just as teaching is done by building blocks or in a hierarchical manner, by linking known concepts to the unknown, or from concrete to more abstract concepts, so should the assessment of students reflect this cognitive structure. More difficult concepts should be assessed after assessing easier ones.

Examples of students' assessments include assignments (individual or group), reports (individual or group), quizzes, choice questions, reflective writing or think pieces, fieldtrips and project reports, laboratory experiments, seminar presentations or active participation in class discussions, and examinations.

Appendix A:
Cover Page of Proposed New Programme

UNIVERSITY OF MINES AND TECHNOLOGY (UMaT)
TARKWA

FACULTY OF MINERAL RESOURCES TECHNOLOGY

DEPARTMENT OF GEOMATIC ENGINEERING

PROPOSED NEW PROGRAMME

BSc GEOMATIC ENGINEERING

MARCH, 2017

Appendix B:
Cover Page of Proposed Review of Existing Programme

UNIVERSITY OF MINES AND TECHNOLOGY (UMaT)
TARKWA

FACULTY OF MINERAL RESOURCES TECHNOLOGY
DEPARTMENT OF GEOMATIC ENGINEERING

PROPOSED NEW PROGRAMME

BSc GEOMATIC ENGINEERING

MARCH, 2017

