Ministry of Higher Education
Majmaah University
Faculty Of Sciences
Department of mathematics

العالي التعليم وزارة
المجمعة جامعة
العلوم كلية
قسم الرياضيات

جامعة المجمعة
Majmaah University

Mathematics Program Guide

1434/1435
2013/2014

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A WORD FROM THE PRESIDENT

Assalamu Alikum Warahmatu Allah Wabarakatu

On behalf of me and all the staff of Majmaah University, I would like to welcome you in the e-portal of Majmaah University. It is well known to everyone Higher Education institutions are deemed as the beacon of knowledge & enlightenment for entering the arena of research and development. The existence of Higher Education institutions also reflects the extent to which the government is greatly concerned about the quality of education provided to its people.

The Custodian of the Tow Holy Mosques, King Abdullah Bin Abdul Aziz & His Crown Prince shall spare no efforts in overcoming any obstacle that may obstruct the educational process in the country.

We are full of hope that Majmaah University shall remain an edifice of knowledge that will generate well knowledgeable students who are capable to contribute with substance & value in the development of their country in all aspects of life.

The achievements of Majmaah University are all attributed to the efforts being exerted by those sincere people who have dedicated their time to make this university a well-respected one.

The directive of the Custodian of the Tow Holy Mosques, King Abdullah Bin Abdul Aziz to establish the University of Majmaah, which will serve a vast number of students in the region, is also an obvious and concrete initiative from the government in supporting education.

Wish you the best of luck

A WORD FROM THE DEAN OF THE FACULTY

All praise is to Allah. Allah's Peace and Blessings be upon Prophet Muhammad and his companions.

My dear student,

It is not new to your knowledge that we are living in a highly developed educational environment these days. For that, we should be very grateful to Allah, then to our wise government. Surely, you realize that these efforts have been exerted for you to increase and improve your capabilities, so be keen on gaining knowledge and utilizing everything you have.

My dear student, you should be aware that there are crucial elements to achieve great success. First and foremost, the obligatory prayers are very immensely important as they make you feel psychologically comfortable and closer to Allah. Second, Making prayers and sleeping early in order to be able to attend lectures with full concentration. Finally, communicating with teaching staff during office hours.

My dear student, recall that how quickly the previous academic years passed, and excellent students found the fruit of their hard labor, but less hardworking students found sorrow and bad feelings.

Dear Student, we highly appreciate your opinions, and we listen to you. We strive to serve you with all the potential available to us. To meet all your needs, we work as a team hoping to have you attend every academic, cultural and sports activities.

Dear Student, we are always keen to develop the educational environment in order to shift from teaching to learning to enable you improve your academic skills and elevate your knowledge.

Dear student, you are the main partner in the application of quality standards altogether so that we can get the academic accreditation. You must recognize the vision and mission of the faculty, its goals and career opportunities for graduates.

Dean of Faculty of Sciences in Alzulfi

Dr. Mohammad Saleh Aloboudi

A WORD FROM THE CHAIRMAN OF THE DEPARTMENT

Many questions along the lines about the benefit of mathematics in our daily lives and why it is heavily taught in both the general education and university have been inquired. Perhaps the right question is what is the area in which mathematics has no benefit?

Mathematics is the basis of science in both its theoretical and applied divisions. It offers effective methods in statistics, data and decision-making, the issues of profits and losses as well as in the narrow fields of computer programming. It also plays a great deal in encryption, modeling of the problems facing the community and finding solutions to them, and many of the engineering and medical applications.

Finally, on my behalf and on behalf of all my fellow members of the faculty acknowledge the great efforts of His Excellency Mr. Dean and His Excellency the Vice-Dean as well as welcome all of our students and look forward to working together to rediscover the effectiveness of mathematics and its central role in our lives.

Ahmad Al Zamami

Head of Department of mathematics

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About Al- Zulfi Faculty of Science

High precious approved establishment of Faculty of Sciences-Zulfi on 5 July 2005 to be another building block in "higher education and part of the City University system in Al-Qassim, and started studying at the Faculty of science in the academic year 2006/2007 the Faculty has four departments are the Department of mathematics and Department of computer and information sciences, Department of physics and Department of medical laboratories in addition to the preparatory year for the departments of medical laboratories and computer and information science Department and year of preparation science of mathematics and physics , And are taught basic science for students of the Faculty of dentistry in faculty.

Accept new students in the preparatory program for medical laboratory, computer Science, physics and mathematics departments for a period of one year as the following details:

1- Preparatory year

A preparatory stage for students who wish to specialize in medical laboratories, departments of computer and information sciences, mathematics and physics designed to provide students with an academic education, English skills and train students in the skills of thinking and learning.

2- Natural sciences program:

This year a preparatory stage for students wishing to major in mathematics or physics, and calculated an average cumulative rate where in theme six levels of study in mathematics or physics, aims to create students receiving academic education in spades and train students in methods of teaching, learning and thinking skills.

The values of Faculty of Science – EL-Zulfi Campus

1- Quality and Excellence

2- Teamwork

3- Development and Continuing Education

4- Community Service.

The Vision of Faculty of Science – EL-Zulfi Campus

1- To reach scientific and research leadership in the faculty specialties, serving community and qualification of students in accordance to professional requirements of modern science.

2- Driving the wheel of development and achievement of excellence, quality, educationally, professionally and academically in light of information and knowledge economy society.

3- To achieve leadership and excellence in building society of education knowledge and applied sciences through the academic and scientific programs, which enable it to be reference in providing an overall professional advice to the Saudi community in accordance with standard quality standards accreditation recognized locally and globally.

The Mission of Faculty of Science – EL-Zulfi Campus

Unparalleled character of scientific excellence through education plans that meet the requirements of academic accreditation standards and the labor market criteria in addition to providing a stimulating academic environment of research and education for the teaching staff members and to provide the community with knowledge services.

Focus on creativity, self-development and production of innovative researches that serve higher education by providing a leading and educational environment that apply the quality standards adopted by world universities.

About the Department of mathematics

The Department of mathematics was established in 1426 H (2005 G). Since its inception, the Department is continuously developing and serving the ever increasing number of students from different colleges of the University. Currently, there are 15 faculty members comprising professors, associate professors and assistant professors specialized in various mathematical areas, namely; analysis, algebra, geometry, topology, numerical analysis, discrete mathematics and different areas of applied mathematics. In addition to faculty members, the Department has also 10 lecturers, investigators, teaching assistants and demonstrators. Apart from teaching duties, the faculty members in the Department are actively involved in research in different areas of mathematics and their research papers are published in reputed international journals. The Department is also planning to establish an Excellence Center in Applied Mathematics to promote high quality of research having practical applications and a B.Sc. Program in actuarial and financial mathematics. In addition, the Department teaches mathematics courses required by other programs of the College of Science such as Computer science and Physics.

A systematic study at the Mathematics department (Bachelor's degree)

Student in the Faculty of Science spends four years spread over eight semesters. The study courses include the core courses (the requirements of the University - Faculty of requirements -the requirements of the department and specialization). The student must finish 137 units of study.

The vision of the department:

Developing communication skills, computational skills, critical thinking, and problem solving and research skills. The theory, discipline, and techniques taught in mathematics courses are especially essential in today's society.

The mission of the Department:

Development of society through providing graduates, who able to compete in education, scientific research and optimum use of technology.

Program Learning Goals and Objectives

1 - Provide the community with qualified competent.

2 – Support E-learning in the department.

3 - Developed and encourage scientific research.

4 - Provide consultancy in mathematics to Community.

5 - Enrich the knowledge of the community to provide distinct programs.

Career Opportunities for Graduates

1- Working in the education in both sectors, public and private.

2- Working as research assistant in the department or in any other Math departments at the Kingdom Universities.

3- Working in research centers.

4- Working in the military sector.

5- Working in IT as data analysts and shareholders in the preparation of strategic plans.

6- High school teachers.

7- Mathematicians in government ministries and institutions and private sectors that require mathematical skills such as: the Ministry of Finance, the Saudi Arabian Monetary Agency, the General Organization for Social Insurance, the Central Department of Statistics and Information, the Public Pension Agency, Banks, Research Centers, ARAMCO, SABIC, etc.

8- - Meritorious students pursue higher studies and ultimately join as faculty in colleges and universities in the Kingdom of Saudi Arabia.

The mathematics department serves the environment and Society

1- Teaching Mathematics and Statistics in the different faculties.

2- Participating in research projects for the environment and society.

3- Participating in various committees within and outside the faculty.

4- Participating in cultural and scientific activities at the faculty and university.

The Values of Mathematics Department

1- Honesty

2- Leadership.

Date of approval by the authorized body (MOHE for private institutions and Council of Higher Education for public institutions).

Campus Branch/Location	Approval By	Date
Zulfi, College of sciences Establishment. Zulfi, Mathematics Program Establishment.	Qassim University	3/4/1426 (11/5/2005)
	MOHE	30/4/1426(7/6/2005)
	High Approval	5/8/1426 (9/9/2005)
Study Start in Zulfi, College of Sciences		1427-1428(2006/2007)
Study Start in Mathematics Program		
Majmaah University Establishment.	MOHE	14/7/1430(7/7/2009)
	High Approval	3/9/1430(24/8/2009)
First batch of Graduation in Zulfi, College Science		1431(2010)
First batch of Graduation in Mathematics Program		
Study Transition to new building at Zulfi		1431(2012)

Teaching at the Mathematics department is subject to the following scheme:

1. The school year consists mainly of two regular semesters and a summer semester, if available.

2. The stage of academic progress is indicated by the academic level since the number of levels to graduate is at least eight levels in conformity with the approved Study Plan.

3. The duration of the level is a full semester (not less than 15 weeks) and this period does not include the periods of registration and final exams.

4. The duration of the summer semester is not less than eight weeks where the teaching time allocated for each course is doubled.

5. A number of courses (subjects) are taught during each academic level according to the program of each specialty in the different departments.

6. Students have to study 137 class units (credit hours) to obtain a Bachelor's Degree as follows:

A. The student studies a number of 29 credit hours during the Preparatory Year (two semesters in one academic year).

B. The student studies 98 credit hours (optional + compulsory) in the Program of Specialization in the various College departments throughout the six semesters following the Preparatory Year (beginning with the third semester).

C. University Requirements: The student selects 10 credit hours of the requirements of the University out of 22 optional credit hours during the period of study at the College.
7 - The student chooses the specialty department before the end of the Preparatory Year based on the conditions set by each department.

The New Academic System (e-Register)

Registration is the cornerstone of the academic system, the center of the educational process, and the first step to start university life. The new Academic System (e-Register) offers new students the following opportunities:
1. To create an e-mail through the site of the Deanship of Electronic Transactions and Communications.
2. Online Registration (registration, adding, and dropping): a student can register, in person, from any location during the periods of registration and dropping plus an additional period specified in the academic calendar; thus, without having to visit the College or the Department, the student can perform the following:
A. Registration: Registration of courses and deciding the required number of credit hours.
B. Adding and dropping: The student may drop and add courses during the first week of teaching provided that the study load does not go above , or lower than, the allowed course load.
4. To view the course schedule of the College and the available/closed groups.
5. To view the study schedule and print it.
6. To view the Academic Record and print a copy (an unofficial copy).
7. To view the results of the final exams as soon as they are put online.
8. To view the Study Plan, the courses passed by the student, and the ones remaining to be studied.
9. To know about the penalties imposed upon the student.
10. To view the financial rewards.
11. To make suggestions and submit complaints.
12. To write the academic performance evaluation of faculty members.
13. To exchange electronic messages and change the password.
* In case of any problem while registering, please consult the College Registration Office

Rules and Mechanisms for Registration of Courses

• The Course is a module that meets the needs of the level specified in the approved Study Plan in each specialty (Program). The Course has a number; a code, a title, and a description depending on the different departments (see the Department's Manual Guide).

• The Course is divided into a set of theoretical lectures and practical lessons (study units) taught weekly during the academic level.

• The Credit Hour is a weekly theoretical lecture that is not less than fifty minutes, or a practical lesson which is not less than one hundred minutes.

• The registration of the courses for all students is done automatically through the website: http://edugate.mu.edu.sa

• The academic levels vary in the number of the units of study, from 14 units to 18 units, for each level.

• The Courses are registered automatically at the beginning of the following semester for the student's convenience. Then, the student can modify the course schedule by adding or dropping.

• The following table shows the student's study load corresponding to the cumulative average:

GPA	2	2.5	3	3.5	4	4.5	5
Hours allowed for registration	14	15	16	17	18	19	20

• The Processes of dropping and adding are performed by the student electronically in the first week of the semester through accessing the gate of the academic system of the University Deanship of Admission and Registration (http://edugate.mu.edu.sa).

• No student has the right to register a course without passing its pre-requisite course.

• Students, who pass all courses without failures, are registered in the courses of the level beginning gradually with the lower levels according to the study plans approved.

• Students, who fail in some courses, are registered in courses that ensure their minimum study load in each semester taking into account the following points:

- No conflict in the course study schedule.
- Satisfying the previous requirements of the course or courses to be registered.

Calculating the Average and Cumulative GPA

The Average and cumulative GPA are calculated every semester for the student automatically by the system. To know how to calculate the averages, you should follow the following steps:

Calculating the Semester Average:

The GPA is calculated considering the following points

1. Knowing the number of hours of the courses.
2. knowing the mark obtained in each course.
3. Knowing the corresponding grade of each mark.
4. Knowing the value of each grade.
5. Knowing the points = number of hours of the course × value of the grade.
6. Determining the total points obtained in all courses of the semester.
7. Determining the total number of hours registered in the semester.
8. The average is calculated every semester according to the following formula:

$$\mathbf{GPA} = \frac{\textbf{Total Points}}{\textbf{Number of hours registered in semester}}$$

The following table shows the percentage of marks, grade and value obtained by the student in each course, which is used to calculate the points:

Mark	Grade	Letter of grade	Value of grade(5)	Value of grade(4)
95-100	Excellent+	A +	5.00	**4.00**
90 to less than 95	Excellent	A	4.75	**3.75**
85 to less than 90	Very good +	B +	4.50	**3.50**
80 to less than 85	Very good	B	4.00	**3.00**
75 to less than 80	Good +	C +	3.50	**2.50**
70 to 75	Good	C	3.00	**2.00**
65 to 70	Pass+	D +	2.50	**1.50**
60 to less than 65	Pass	D	2.00	**1.00**
Less than 60	Failure	E	1.00	**0**
Absence from lectures(25 % or more)	Debarred	H	1.00	

Calculating the Average Cumulative

The GPA semester average is calculated as follows:

1) The grand total of points (for all semesters that have been studied).

2) The grand total of credit hours (for all semesters that have been studied).

3) The cumulative average is calculated according to the following formula:

$$\text{GPA} = \frac{\text{Grand total of points}}{\text{Grand total of cridit hours}}$$

Here is an example of how to calculate the grades above:

Calculating the grade of the first semester:

Course	Credit hours	Mark	Grade	Grade value	Points
PENG111	8	67	D+	2.5	8×2.5=20
PMTH112	2	73	C	3	2×3=6
PCOM113	2	77	C+	3.5	2×3.5=7
PSSC114	2	81	B	4	2×4=8
	14				41
GPA=Total points ÷ No. of hours registered in semester = 41 ÷14=2.93					

Calculating the grade of the second semester:

Course	Credit hours	Mark	Grade	Grade value	Points
PENG121	6	88	B+	4.5	6×4.5=27
PMTH127	4	97	A+	5	4×5=20
PENG123	2	73	C	3	2×3=6
PPHS128	3	80	B	4	3×4=12
	15				65
GPA=Total points ÷ No. of hours registered in semester = 65 ÷15=4.33					

Calculating the average cumulative:

GPA = Total points ÷ Total hours of all semesters = 106 ÷ 29 = 3.66

Dropping and Adding of a Course

• The process of dropping and adding is performed through portal (http://edugate.mu.edu.sa) during the first week of the semester only; but the number of credit hours registered has to be at least 12 hours.

• The student may drop only one course due to an excuse acceptable to the Dean of the College. This procedure should occur at least five weeks before the final exams begin. The student has the right to apply for such a procedure at a maximum of four courses during the whole period of study at the College.

Attendance, postponing and dropping out of College

• The student must be regular in attendance attending at least 75% of the lectures and the practical classes.

• If any student has a percentage of absence of 25% , or more, in any course, he is denied access to the final exam of this course and his result is F.

• A student may apply for postponement of the study before the beginning of the semester for an excuse accepted by the College Board. The postponement should not exceed two consecutive semesters or three intermittent semesters as a maximum limit while studying at the College.

• The University Council may, in case of necessity, exempt the applicant from the previous provision.

• If a student drops out of College for one semester without requesting the postponement of his registration, the University has the right to dismiss his registration. The University Council has the right to do this for a lesser period of time.

• The student is not considered as dropping out of College if he is a visiting student at another university.

The Entry requirements for the department are

1- General assimilation of the Department,
2- Cumulative average for the student,
3- The wishes of the student.

Description of the Mathematics Program

Mathematics is a universal part of human culture. Its universality makes it a powerful tool in a variety of endeavors including the study of the natural sciences, the social sciences, computer science, business, and economics. Studied for its own sake, mathematics is appreciated as much for its elegance and beauty as for its practicality. Mathematics is the science of discovering patterns yet unlike the other sciences mathematics offers a standard of certainty through mathematical rigor and proof. The study of mathematics is one of the cornerstones of a liberal education, training the mind in logical thought, precise expression, and critical thinking.

The mathematics curriculum at Zulfi Faculty is designed to meet the needs of students who have one of the following objectives to:

(1) Pursue graduate study in mathematics;

(2) Prepare for careers as mathematicians in industrial or governmental laboratories, and in fields which rely mainly on mathematics such as actuarial work, statistical analysis, and economics;

(3) Teach mathematics in elementary and secondary schools;

(4) Contribute to their liberal education by studying the language and fundamental methods of mathematics.

The mathematics department of Zulfi Faculty offers two concentrations for the major in mathematics. The General Mathematics Curriculum offers a sound foundation in pure mathematics for those seeking careers in mathematical fields and those who plan to continue their study of higher mathematics in graduate school. The Concentration for Prospective Math Teachers is intended for those students who are preparing for careers teaching mathematic

STUDY PLAN

At the beginning of the academic year 1433-1434 H (2012-2013 G), the College of Science joined the Program of the Preparatory Year in the University. This required the development of the Program Study Plan to be compatible with the new arrangement. The updated plan has passed through the official stages and it has been approved by the academic authorities in the Department, the College and the University. This Study Plan has become applicable to the new students starting from the academic year 1435-1435H (2013-2014 G).

CURRICULUM OF THE DEPARTMENT OF MATHEMATICS

Requirements for the degree of Bachelor of Science (Mathematics) to obtain a bachelor's degree in mathematics, the student must successfully finish 137 credit hours.

The general structure of the plan

Courses Requirement	Percentage of completion (%)	The number of credit hours
University	**8.75%**	**12**
Faculty	**21.17%**	**29**
Department	**72.99%**	**94**
Free courses	**1.45%**	**2**
Total	**100**	**137**

Requirements and electives:

Requirement	Type of requirement	Total credit hours	The percentage of the total hours of study plan	The observations of the Committee
University	Compulsory	**12**	**8.75%**	
Faculty	Compulsory	**29**	**21.16 %**	
	Optional	---------	----------	
Department	Compulsory	**84**	**6 1. 31%**	
	Optional	**10**	**7.29%**	
Free courses	**2**		**1.45%**	
Total hours and rates	**137**		**100%**	

University requirements:

Course code	Course name	Credit Hour	Prerequisite	Reviews
SALM 101	Introduction to Islamic culture	**2(2+0+0)**		
SALM 102	Islam and society construction	**2(2+0+0)**		
SALM 103	Islam of economic system	**2(2+0+0)**		
ARAB101	Language Skills	**2(2+0+0)**		
…….	University Elective	**2(2+0+0)**		
……	University Elective	**2(2+0+0)**		

Faculty compulsory requirements:

Course code	Course name	Credit Hour	Prerequisite	Reviews
PENG 111	English Language 1	**8(2+0+6)**		
PENG 121	English Language 2	**6(2+0+4)**		
PMTH 112	Introduction to Mathematics1	**3(2+1+0)**		
PMTH 127	Introduction to Mathematics 2	**4(4+0+0)**		
PPHS 128	Physics	**3(2+0+1)**		
PCOM 113	Computer Skills	**2(2+0+0)**		
PENG 123	Scientific and Engineering English Language	**1(1+0+1)**		
PSSC114	Communication and Education Skills	**2(1+0+1)**		

The Mandatory Program Requirements:

course code	Course name	Credit Hour	Pre-Requisite	Co-Requisite
MATH 231	Mathematics Basis	4(3+1+0)	PMTH 127	
STAT201	Statistics and probability(1)	3(2+1+0)	PMTH 127	
MATH 201	Calculus (1) Calculus 1	4(3+1+0)	PMTH 127	
MATH 271	Introduction to geometry	4(3+1+0)	PMTH 127	
MATH 202	Calculus (2)	4(3+1+0)	MATH 201	
MATH 203	Calculus in several variables	4(3+1+0)	MATH 202	
MATH 204	Vector Calculus	4(3+1+0)	MATH271 + MATH 202	
MATH 241	Linear algebra (1)	4(3+1+0)	MATH 231	
MATH 321	Introduction to differential equations	4(3+1+0)	MATH203	
MATH 351	Numerical analysis (1)	4(3+1+0)	MATH 241 MATH 21+	
MATH 352	Linear Programming	4(3+1+0)	MATH 241	
MATH 353	Mathematical application in computer	4(3+1+0)	MATH203+ MATH351	
MATH 322	Mathematical methods	4(3+1+0)	MATH 321	
MATH342	Group theory	4(3+1+0)	MATH 241	
MATH 344	Number theory	2(2+0+0)	MATH 231	
MATH 332	Graph Theory	2(2+0+0)	MATH 231	
STAT302	Statistics and probability (2)	4(3+1+0)	STAT 201 +MATH 203	
MATH 381	Real Analysis (1)	3(2+1+0)	MATH 203	
MATH443	Rings and Fields	3(2+1+0)	MATH 342	
MATH 472	Introduction to Topology	3(2+1+0)	MATH 381	
MATH 473	Introduction to Differential Geometry	4(3+1+0)	MATH 241 +MATH 204	
SALM 103	Economic system in Islam	2(2+0+0)	SALM 101	
MATH 483	Complex Analysis	4(3+1+0)	MATH 381	
MATH 484	Introduction to functional analysis	3(2+1+0)	MATH 472	

The Elective Program Requirements:

course code	Course name	Credit Hour	Pre-Requisite	Co-Requisite
MATH344	Number Theory	2(2+0+0)	MATH231	
MATH332	Graph Theory	2(2+0+0)	MATH231	
MATH345	Linear Algebra 2	2(2+0+0)	MATH241	
MATH433	Mathematical logic	2(2+0+0)	MATH231	
MATH485	Fourier Analysis	2(2+0+0)	MATH423 +MATH483	
MATH334	Discrete Mathematics	3(2+1+0)	MATH231	
MATH454	Optimization Technique	3(2+1+0)	MATH352	
MATH405	Calculus of Variation	3(2+1+0)	MATH321	
MATH482	Real Analysis 2	3(2+1+0)	MATH 381	
MATH335	Mathematics History	2(2+0+0)	MATH231	
MATH412	Topics in Applied Mathematics	3(2+1+0)	MATH321	
MATH311	Financial Mathematics	2(2+0+0)	MATH202	
MATH455	Numerical Analysis 2	3(2+1+0)	MATH351	
STAT404	Data Analysis	2(2+0+0)	STAT302	
STAT303	Inventory Models	2(2+0+0)	STAT302 +MATH352	

- **Optional Program Requirements**

The student selects 10 credit hours)

- **Training requirements:**

(Training courses or practical education or experience in the field):

Students are trained in a Government or private agencies commensurate with the theme and the duration of training for at least six weeks with at least four hours a week, a needs train's student Faculty official letters indicating the quality of training and the extent and progress of the student.

Prerequisite:

100 credits

MATHEMATICS COURSES DESCRIPTION

(Distribution decisions with respect to levels)

First level (pre-primary)

Code Course	Course name	Credit Hour	Prerequisite	Reviews
PENG 111	English Language 1	8(2+0+6)	----	
PMTH 112	Introduction to Mathematics 1	2(2+0+0)	----	
PCOM 113	Computer Skills	2(1+0+1)	----	
PSSC 114	Communication and Education Skills	2(1+0+1)	----	
Total units		14		

Math PMTH112 Introduction to mathematics 1(2 Hours credit)

Course Format: Two Hours of lecture.

Prerequisite:

Description: Preliminary mathematical concepts, Equations and inequalities, Functions and curves, Polynomials and fractional functions, Exponential and logarithmic functions.

Objectives: The course aims to provide the students with an amount of knowledge, cognitive skills and interpersonal skills. Also, taking responsibility, communication skills and the use of information technology, along with psychomotor skills.

Outcome:

1- To get students acquainted with the mathematical concepts, including the real number, exponents, polynomials, complex numbers, quadratic equation, inequalities function, linear function, inverse and the exponential function and the logarithmic function). In addition to solving the mathematical problems represented by (solving linear equations and quadratic equations and the absolute value of solving inequalities).

2- The course aims to provide the students with the ability of teamwork and taking individual and social responsibility as well as, the ability of self-learning.

3- This course contributes in mastering the students to technical and numerical communication skills.

Reference: College Algebra and Trigonometry – Part 1

1- Kaufmann, Barker and Nation "College Algebra and Trigonometry" Fifth Edition, New York (2005)

2- Edward B. Burger et al. "Algebra 1" New York (2007)

3- Edward B. Burger et al. "Algebra 2" New York (2007

Second level (pre-primary)

Code Course	Course name	Credit Hour	Prerequisite	Reviews
PENG 121	English Language 2	6(2+0+4)	PENG111	
PMTH 127	Introduction to Mathematics 2	4(4+0+0)	PMTH 112	
PENG 123	English for engineering and scientific disciplines	2(1+0+1)	PENG111	
PPHS 128	Physics	3(2+0+1)		
Total units		15		

Math PMTH27 Introduction to mathematics 2(4 Hours credit)

Course Format: Four Hours of lecture.

Prerequisite: PMTH112

Description: Trigonometric functions and Polar coordinates, solving a System of two linear equations in 2 variables, Matrices, Conic Sections, Limits and Continuity, Differentiation.

Objective: The course aims at providing the student with the proper knowledge, cognitive skills, interpersonal skills, responsibility, communication skills, use of information technology skills and self – kinetics skills.

Outcome: 1- Students should know mathematical concepts such as the trigonometric ratio, standard angles, matrices (zero, identity, square, rectangle, column and raw matrices) in addition to determinants, conic sections (parabola, ellipse, hyperbola), limits and continuity, derivatives and solving linear equations.

2- This course aims at providing students with the ability to participate in teamwork and to gain personal responsibility.

3- This course contributes in giving students proper technical and numerical skills.

Reference: College Algebra and Trigonometry – Part 2

1- Aufmann ,Barker and Nation "College Algebra and Trigonometry" Fifth Edition ,New York (2005)
2- Edward B. Burger et al. "Algebra 1" New York (2007)
3- Edward B. Burger et al. "Algebra 2" New York (2007)

Third level

Code Course	Course name	Credit Hour	Prerequisite	Reviews
MATH 231	Mathematics Basis	4(3+1+0)	PMTH 1 27	
STAT 201	Statistics and probability 1	3(2+1+0)	PMTH 1 27	
MATH 201	Calculus (1)	4(3+1+0)	PMTH 1 27	
MATH 271	Introduction to Geometry	3(2+1+0)	PMTH 1 27	
ARAB101	Language Skills	2(2+0+0)	----	
SALM 101	Islamic culture	2(2+0+0)	.....	
	Total units	18		

Math231 Basis of Mathematics (4 Hours credit)

Course Format: Three Hours of lecture and one hour of exercises per week, and additional 7 Hours of Discussion/self-study and office hours, at discretion of the instructor.

Prerequisite: Math PMTH127

Description: Mathematical Logic - Mathematical Induction-Functions and their properties - Sets and their properties-Relations and their properties - Representing relations - Equivalence relation-Groups and their properties-Ring and their properties - polynomials ring - Partial fractions-Field and their properties.

Objectives:

1. Have the knowledge of mathematical logic and operation on them.

2. Have the knowledge of mathematical induction.

3. Studying the function, sets and their properties.

4. Studying the relations and their properties and how we can represented, also studying the equivalence relation.

5. Have the knowledge of groups and their properties.

6. Studying the rings and their properties.

7. Studying the field and their properties.

Outcomes: Upon successful completion of Math 231 – Basis of Mathematical, students will be able to:

1- Define and recognize the fundamental in basic mathematics such as: Mathematics logic, mathematical induction, sets, functions, relations, groups, rings, field and partial fractions.

2- Student's ability to **write** Mathematical equations in a correct mathematical way.

3- **Outline** logical thinking.

4- The student should **illustrate** how take up responsibility.

5. **Define and recognize** the fundamental in basic mathematics such as: Mathematics logic, mathematical induction, sets, functions, relations, groups, rings, field and partial fractions. To improve logical thinking

6. Student's ability to **write** Mathematical equations in a correct mathematical way

7. Must be **shown** the ability of working independently and with groups.

8. The student should **illustrate** how to communicating with: Peers, Lecturers and Community.

9. The student should **interpret** how to know the basic mathematical principles using the internet

10. The student should **appraise** how to Use the computer skills and library

11. The student should **illustrate** how to Search the internet and using software programs to deal with problems.

References:

1- Discrete Mathematics and its applications; Kenneth Rosen, WCB/McGraw Hill 2012; 007338309013: 978-0072899054.

2- A Book of Abstract Algebra: 2nd Edition; J.Mathos, R. Campanha, McGraw Hill 1990 10: 0-486-47417-813: 978-0-486-47417-5.

Math201 Calculus 1 (4 Hours credit)

Course Format: Three Hours of lecture and one hour of exercises per week, and additional 7 Hours of Discussion/self-study and office hours, at discretion of the instructor.

Prerequisite: Math PMTH127

Description: Real numbers and real line – Inequalities – Functions – The graph of a functions – Even and Odd Functions – Composite of Functions – Trigonometric Functions – Inverse Functions – Inverse Trigonometric Functions – Limits – Properties of Limits – Techniques for evaluating Limits – Infinite Limits – Continuity – Properties of Continuity – Differentiation – The Relationship between Differentiation and Continuity – Differentiation Laws – Derivative of Trigonometric and Inverse Trigonometric Functions – Derivative of Hyperbolic and Inverse Hyperbolic Functions –Logarithmic and Exponential Functions and their derivatives – Using the first derivative to studying an increasing and decreasing functions – Chain Rule - Implicit Differentiation – Lo hospital's Rule - Rolle's Rule and the Mean Value Theorems - Using Differentiation to studying concavity of functions and studying some applications of Differentiation.

Objective: 1. Studying Real numbers and real line.

2. Studying the properties of functions and how to draw the curve of the function.

3. Finding limit of the function and studying its Continuous.

4. Studying the relationship between Differentiation and Continuity.

5. Finding the tangent of the curve and the maximum and minimum values of the function.

6. Have the knowledge of how the function increased and decreased.

Outcomes: 1- Define Real numbers and real line – Inequalities.

2- The students will explain and interpret a general knowledge of Calculus.
3- Enable students to analyses the mathematical problems.

References:

1- Calculus Smith/Minton Mc Graw Hill 2012 9780071316576.

2- Single Variable Calculus: Early Transcendentals seventh edition James Stewart Cengage learning 2011 13:978 -0-538-49857-8 0:978 -0-538-49867-.

Stat 201 Statistics and probability (1) (3 Hours credit)

Course Format: Two Hours of lecture and one hour of exercises per week, and additional 5 Hours of Discussion/self-study and office hours, at discretion of the instructor.

Prerequisite: PMTH127

Description: Introduction and overview of Definition of the probability, Definition of the random variable – the probability function of the discrete random variable - the density probability function of the continuous random variable, The Expectation and the variance of the random variable (Discrete and Continuous), Discrete probability Distributions (Bernoulli, Binomial and Poisson), Continuous probability distribution (Normal distribution and its application). - Approximate probabilities for some binomial and Poisson distributions, Other probability distributions: uniform, exponential, and gamma distributions, functions of random variables- mathematical expectation- the moment generating function, Properties of mathematical expectation.

Objective: This course is designed to

- Follow on from, and reinforce, a level mathematics.

- Present students with a wide range of mathematics ideas in preparation for more demanding material later.
- Enable students to apply Mathematical tools/ techniques to product project Broaden skills in team work, critical thinking, communication, planning and scheduling through design project
- Enable students to consider safety, ethical, legal, and other societal constraints in execution of their design projects

Outcomes:

1. Know how a team can use the Statistical Inference process to carry out a project

2. Solve open-ended problems, cope with decision making and satisfy competing objectives

3. Apply knowledge, as needed, to design a satisfactory system to achieve a final successful project

4. Prepare a needs-assessment and define a deliverable for a project

5. Understand the impact of aesthetic and human aspects

6. Use and integrate the fundamentals studied previously towards the goal of analyzing and designing project to achieve

7. Deliver a final oral presentation for their project.

8. Produce final design report as part of their deliverable

9. Use appropriate software for project, modeling, and analysis

References:

1. Applied Statistics and Probability for Engineers. Seventh edition D.C. Montgomery & G. C. Runger John Wiley & Sons. 2011: 13:978 -0-470-05304-1
2. A Modern Introduction to Probability and Statistics Frederik MIChel Dekking Cornelis Kraaikamp Hendrik Paul Lopuhaa ¨Ludolf Erwin Meester Springer-Verlag London Limited : 2005: 13: 978-1-85233-891-1

Math271 Introduction to Geometry (3 Hours credit)

Course Format: Two Hours of lecture and one hour of exercises per week, and additional 5 Hours of Discussion/self-study and office hours, at discretion of the instructor.

Prerequisite: PMTH 127

Description: Plane Analytic Geometry: The Cartesian and polar coordinates – The straight line in its different forms – Equation of two straight lines – The circle –

Transformation and rotation of axes – Conic departments in general form. Solid Analytic Geometry: Rectangular, spherical and cylindrical coordinates – The distance between two points- Direction cosines of a line – Angle between two lines – The plane in space – The line in space – Quadric surfaces (Cylinder- Cone – Sphere – Ellipsoid – Hyperboloid of one sheet – Hyperboloid of two sheets – Elliptic parabolic – Hyperbolic parabolic).

Objective: 1- Understand the general concepts of various types of coordinates

2- Have an understanding of the equations of a straight line and circle

3- Draw the Conic sections in plane and space and derive their equations.

Outcomes:

1. Define the Cartesian and polar coordinates – The straight line in its different forms – Equation of two straight lines

2. Outline the circle – Transformation and rotation of axes – Conic sections in general form

3. State Rectangular, spherical and cylindrical coordinates – The distance between two points- Direction cosines of a line – Angle between two lines

4. Recall the plane in space – The line in space

5. Recognize Quadric surfaces (Cylinder- Cone – Sphere – Ellipsoid – Hyperboloid of one sheet – Hyperboloid of two sheets – Elliptic paraboloid – Hyperbolic paraboloid).

6. Explain the Cartesian and polar coordinates – The straight line in its different forms – Equation of two straight lines

7. Summarize Conic sections in general form

8. Explain the difference between different kinds of conic sections in the general form.

9. Interpret Cylinder- Cone – Sphere – Ellipsoid – Hyperboloid of one sheet

10. Analyze Hyperboloid of two sheets – Elliptic paraboloid – Hyperbolic paraboloid

References:

1. Algebra and Trigonometry with Analytic Geometry Earl W. Swokowski , Jeffery A.Cole Cengage Learning: 2011 -10: 0840068522-13: 978-0840068521.
2. Calculus and Analytic Geometry (9th Edition) George B. Thomas; Ross L. Finney Addison Wesley: 1995- 13: 978-0201531749

Forth level

Code Course	Course name	Credit Hour	Prerequisite	Reviews
MATH 202	Calculus (2)	4(3+1+0)	MATH 201	
MATH 203	Calculus in several variables	4(3+1+0)	MATH 202*	
MATH 204	Vector Calculus	4(3+1+0)	MATH 202 +MATH 271	
MATH 241	Linear algebra (1)	4(3+1+0)	MATH 231	
……..	University Elective	2(2+0+0)	MATH 201	
Total units		18		

Math202 calculus (2) (4 Hours credit)

Course Format: Three Hours of lecture and one hour of exercises per week, and additional 7 Hours of Discussion/self-study and office hours, at discretion of the instructor.

Prerequisite: MATH 201

Description: Definition of Integral and its properties - Mean value theorem of integral. The fundamental theorem of Calculus- Indefinite integrals- Standard integrals- Derivatives and Integrals of hyperbolic and inverse hyperbolic functions- Techniques of Integrations: Substitution method- Integration by Parts- Trigonometric Substitutions- Integrals involving Quadratics- Integration by Partial Fractions

Objective: 1. Studying Definite integral and its properties.

2. Studying the mean value theorem of integral.

3. Studying the fundamental theorem of Calculus.

4. Have the knowledge of Indefinite integral and Standard integrals.

5. Have the knowledge of integrals of hyperbolic and inverse hyperbolic functions.

6. Have the knowledge of Integration methods.

7. Know how to calculus the under a curve and the volume of rotation of a curve.

8. Define the arc length and the area of a rotated curve surface.

9. Recall the implicit integrations and know how to solve it.

10. Define the L'Hopital rule to solve the limits.

Outcomes:

1. Define Definite integration and mean value theorem
2. outline Fundamental theorem of calculus

3. State hyperbolic and inverse hyperbolic functions with their derivatives and integrations.

4. Recall Derivative and integrations properties

5. Define implicit integration and area under the curve

6. Recognize volume of rotation and length of an arc

7. State the polar coordinates and the relation between them and cartisian coordinates.

8. State L'Hopital rules in solving the limits.

9. Explain how to find the area under the curve and the volume of rotation

10. Summarize the ways of integrations.

11. Explain the definite integration.

12. Compare between polar and cartasian coordinates in solving integrations.

13. Analyze arc length and the area of the surface of rotation

14. Interpret the implicit integration and using L'Hopital rule to find the limits

15. Interpret How to solve different kinds of integrations

16. Analyze mathematical programs as matlab to plot different curves and surfaces

References:

1. Calculus Smith/Minton. Mc Graw Hill :2012 - 9780071316576
2. Calculus and analytical Geometry:9th Edition George B. Thomas,Ross L. Finney Addison-Wesley publishing company : 1996 - 0-201-53174-7

Math241 Linear Algebra (4 Hours credit)

Course Format: Three Hours of lecture and one hour of exercises per week, and additional 7 Hours of Discussion/self-study and office hours, at discretion of the instructor.

Prerequisite: Math 231

Description: Matrices and their operations- Types of matrices- Elementary transformation- Determinants-elementary properties of determinants- Inverse of a matrix- Rank of matrix- Linear systems of equations Vector spaces- Linear independence - Finite dimensional spaces - Linear subspaces - Linear dependence and independence, basis and dimension(also, in subspaces), rank of a matrix, linear equations of vectors spaces, coordinates Linear mappings- Kernel and image of a linear mapping- Eigenvalues and eigenvectors of a matrix and of a linear operator mapping..

Objectives:

1. Studying matrices and operations on them.
2. Studying the vector spaces, subspaces and their properties.
3. Solving system of homogeneous and non-homogeneous linear equation.
4. Have the knowledge of the basis and dimension of the vector space.

5. Have the knowledge of linear operators and How to give it in a matrix form.
6. Have the knowledge of Eigen values and eigenvectors of a matrix and their properties.
7. Studying determinants and operations on them to compute the inverse of matrix.

Outcomes: Upon successful completion of Math 241 – Linear Algebra, students will be able to:

1. Evaluate systems of linear equations,
2. Analyze vectors in R^n geometrically and algebraically,
3. Recognize the concepts of the terms span, linear independence, basis, and dimension, and apply these concepts to various vector spaces and subspaces,
4. Use matrix algebra and the relate matrices to linear transformations,
5. Calculate and use determinants,
6. Evaluate and use eigenvectors and eigenvalues,
7. Analyze finite and infinite dimensional vector spaces and subspaces over a field and their properties, including the basis structure of vector spaces,
8. Use the definition and properties of linear transformations and matrices of linear transformations and change of basis, including kernel, range and isomorphism,
9. Calculate with the characteristic polynomial, eigenvectors, and eigenvalues.
10. Evaluate inner products and determine orthogonality on vector spaces.

References:

1. Linear algebra schaum Seymour Lipschutz, Marc LipsonMc Graw Hill: 2012-10: 0071794565 13978-0071794565.
2. Introduction to Linear Algebra, 4th Edition Gilbert Strang. Wellesley-Cambridge Press :2009-International Edition:

Math204 vector Calculus (4 Hours credit)

Course Format: Three Hours of lecture and one hour of exercises per week, and additional 7 Hours of Discussion/self-study and office hours, at discretion of the instructor.

Prerequisite: Math271 and Math202

Description: - Vector fields in two-three dimensions

- Algebraic operations on vectors. Definitions of gradient- divergence- curl on the vectors.

- Provide the basic elements of analytical geometry- plans and lines in three dimensional space and surfaces. --Equation of tangent and governing on the surface.
- Calculating the dimensional derivatives-Vector functions - functions on one variable
- Curvilinear: curvilinear coordinates - orthogonal curvilinear coordinates: line integral- surface integral- volume integral
- Relationship between line integral- surface integral- volume integral and theorems Gausses- Green- Stokes.

Objective:

[1] to do the algebraic operations and the scalar and vector products in 2 – 3 D.

[2] to find equations of line and plane in 3 – D.

[3] to find the curvature and directional derivative

[4] to satisfy the theorems of Green, Gauss and Stokes.

Outcomes:

1. D**efine** the fundamental in vectors calculus, equation of lines, plane, the vector differential Del, the gradient, divergence and curl, vector integration, line integral, surface integral, volume integral, some theorems on it. Curvilinear coordinates, orthogonal curvilinear coordinates, cylindrical, spherical coordinates.
2. **Outline** the logical thinking.
3. S**tate** the physical problems by mathematical method
4. The students will **explain and interpret** a general knowledge of Linear Algebra
5. Enable students to **analyses** the mathematical problems
6. Student's ability to **write** physical equations in a correct mathematical way

References:

1. Vector Calculus. Susan Jane Colley. Pearson :2011- 0321780655
2. Vector Calculus. MIChael Corral Schoolcraft Faculty: 2008 - B006DTH4THEORETICAL

Math203 Calculus in Several variables (4 Hours credit)

Course Format: Three Hours of lecture and one hour of exercises per week, and additional 7 Hours of Discussion/self-study and office hours, at discretion of the instructor.

Prerequisite: Math202

Description: Cartesian, cylindrical and spherical coordinates-Functions of two or more variables-Domain of the function-three dimension rectangular coordinates-Chain rule-Limits-Continuity-Partial derivative-Higher order partial derivatives-Differentiation of composed function- Maxima and minima-Method of Lagrange multipliers for maxima and minima. Double integrals in Cartesian and Polar coordinates - Triple integrals in spherical and cylindrical coordinates-Sequences and Infinite series- convergence tests-Representation of functions by power series-Taylor and Maclaurin and the binomial series.

Objective: This module aims to provide students with some background in integration techniques

On completing this module, Student should

1- Have an understanding of the basic topic of calculus such as derivatives and integrals
2- Have an understanding of the polar coordinates system

Have an understanding of double and triple integrals

Outcomes:

References:

1. Calculus of one and several Variables, Ninth Edition Salas,Hille, Etgen . John Wiley &Sons, New York 2003 - 0471-23120-7.
2. Multivariable Calculus7th edition. James Stewart. Brooks Cole: 2011: 978-0538497879

Fifth level

Code Course	Course name	Credit Hour	Prerequisite	Reviews
MATH 321	Introduction to Differential Equations	4(3+1+0)	MATH 203	
MATH 351	Numerical analysis (1)	4(3+1+0)	MATH 241 +MATH 321	
MATH 352	Linear programming	4(3+1+0)	MATH 241	
MATH 353	Mathematical applications in Computers	2(1+1+0)	MATH 203 +MATH 351	
----	Department Elective	2(2+0+0)	-	
SALM10 2	Islam and society construction	2(2+0+0)	SALM 101	
Total units		18		

Math321 Introduction to Differential Equations (4 Hours credit)

Course Format: Three Hours of lecture and one hour of exercises per week, and additional 7 Hours of Discussion/self-study and office hours, at discretion of the instructor.

Prerequisite: Math203

Description: Basic concepts: Definitions. Classifications of ODEs. Solutions types. Origin of ODEs. Basic First-order differential equations. Methods of solutions - Separable variables - Homogeneous equations - Exact equations - Linear equations - Equations of Bernoulli - Ricotta. Substitutions - Picard's methods - Linear differential equations of higher-order - Homogeneous equations with constant coefficients, Method of undetermined coefficients, Method of variation of parameters. Differential equations with variable coefficients, Cauchy-Euler equations - Laplace Transform - Applications of Laplace transform to solve ordinary differential equations

Objective: 1. Students will be able to model physical phenomena with first-order differential equations, to solve such equations using analytic, graphical, or numerical methods, and to analyze and communicate the results.

Students will display proficiency by demonstrating the following competencies:

a. Identify the order of an ordinary differential equation and determine whether it is linear or nonlinear.

b. Identify a separable first-order equation and find a family of solutions; find singular solutions.

c. Identify a first-order linear equation and find the general solution using an

integrating factor.

d. Identify an exact differential equation and find a family of solutions.

e. Solve initial-value problems involving first-order separable, linear, and exact equations.

f. Solve selected application problems involving first-order equations.

2- Students will be able to model physical phenomena with second-order differential equations, to solve such equations using analytic methods, and to analyze and communicate the results.

Students will display proficiency by demonstrating the following competencies:

a. Identify a second- or higher-order linear homogeneous differential equation and state the general form of the solution using a linearly independent set of functions.

b. Solve a second- or higher-order linear homogeneous equation with constant coefficients using the characteristic equation; solve an associated initial-value problem.

c. Solve a second-order linear nonhomogeneous equation with constant coefficients using the method of variation of parameters; solve an associated initial-value problem.

d. Use the definition to compute the Laplace transform of a function.

e. Use step functions to represent a piecewise-continuous function.

f. Solve a linear differential equation using Laplace transforms.

3. Students will be able to use power series to solve differential equations.

Students will display proficiency by demonstrating the following competencies.

a. Find a power series solution for a linear differential equation about an ordinary

point; solve an associated initial-value problem.

b. Identify singular points for a linear differential equation.

Outcomes:

1. Define the basic fundamentals in ODE such as:

Differential equations, order of DE, degree of DE, Classifications of DE, Linear, nonlinear, exact, homogeneous, Bernolli, Ricataau, Claiarot, Cauchy-Euler differential equations and the power series solutions

2. **Apply** mathematical concepts to models of real world problems

3. The students will **explain and interpret** the basic fundamentals of ODE.

4. Enable students to **analyses** the mathematical problems.

5. Students will have the ability to **introduce** the physical problems in a mathematical model.

6. The student should **illustrate** how to Search at the internet and using software programs to deal with problems.

7. The student should **interpret** how to Know the basic mathematical principles using the internet

References:

1- Ordinary Differential Equations. William A Adkins, Mark G Davidson. Springer: 2012-1461436176 13: 9781461436171.

2- Schaum's Outline of Differential Equations, 3rd edition Richard Bronson ,Gabriel Costa. McGraw-Hill :1994-10: 007145687213: 978-0071456876

Math351 Numerical Analysis 1 (4 Hours credit)

Course Format: Three Hours of lecture and one hour of exercises per week, and additional 7 Hours of Discussion/self-study and office hours, at discretion of the instructor.

Prerequisite: Math240 and Math321

Description: Numerical methods for solving nonlinear equations (bisection – iteration – Newton - false position ...)- errors and rates of convergence- Direct methods for solving linear systems (Gauss elimination, LU decomposition) and iterative methods (Jacobi –Gauss Seidel – Relaxation)-errors- iteration matrices and convergence of iterative methods- Polynomials interpolation (Lagrange-Newton's methods: divided differences- forward and backward differences) and analysis of errors- Numerical differentiation and integration- errors and accuracy- Gaussian integration formulas- Euler and Taylor methods for solving differential equations of first order .

Objective:

1. Students should obtain an intuitive and working understanding of some numerical methods for the basic problems of numerical analysis.
2. Students should gain some appreciation of the concept of error and the need to analyze and predict it.

3. Students should develop some experience in the implementation of numerical methods by using a computer, including an understanding of computer arithmetic and its effects.
4. Demonstrate knowledge and understanding of numerical methods to solve nonlinear equations. Examine the accuracy and stability these methods.
5. Analyse a mathematical problem and determine which numerical technique to use to solve it.
6. Demonstrate knowledge and understanding of numerical methods to solve systems of linear equations by direct and iterative methods. Examine the accuracy and stability these methods.
7. Develop appropriate numerical methods to approximate a function.
8. Develop appropriate numerical methods to solve a differential equation.
9. derive appropriate numerical methods to evaluate a derivative at a value
10. Derive appropriate numerical methods to calculate a definite integral.

Code various numerical methods in a modern computer language.

Outcomes: By the end of the module students will:

1. be able to solve a range of predictable and unpredictable problems in Number Analysis, have an awareness of the abstract concepts of theoretical mathematics in the field of Numerical Analysis, have a knowledge and understanding of fundamental theories of these subjects demonstrated through one or more of the following topic areas: Non-linear equations, Errors, Polynomial interpolation, Numerical differentiation and integration.

2. The students will explain and interpret a general knowledge of Numerical Analysis

3. Enable students to analysis the mathematical problems.

4. The student should illustrate how to communicating with: Peers, Lecturers and Community.

5. The student should interpret how to Know the basic mathematical principles using the internet.

6. The student should appraise how to Use the computer skills and library.

References:

1. Numerical Analysis. 9th ed. R.L. Burden and J.D. Faires:Edition Brooks / cole: 201113: 978-0-538-73563-6.

2. An Introduction to Numerical Analysis. Endre Süli, David F. Mayers Cambridge : 2003- 0521810264-0521007941

Math352 Linear Programming (4 Hours credit)

Course Format: Three Hours of lecture and one hour of exercises per week, and additional 7 Hours of Discussion/self-study and office hours, at discretion of the instructor.

Prerequisite: Math241

Description: Introduction to operations research-Mathematical model for some real problems- Mathematical formulation of linear programming problem- Graphical method for solving linear programming problems- Convex sets-Polygons- Extreme point- Optimality theorem- Analytical method (Simplex method) – Big-M method – Two-phase method- Formulation mistakes- Duality problem- Sensitivity analysis- Application to transportation and network problem

Objective:

1. Knowing how to make the mathematical model of some actual problems (the mathematical formulation of the linear programming problem
2. Recognizing the optimality theory and the different methods for solving the linear programming problem.
3. Knowing the problem ,the solution of the duality problem and sensitivity analysis for each problem.
4. Knowing how to apply the linear programming in solving some of the actual problem (transportation and networks problems).

Outcomes:

1. Define the Operations Research and the mathematical models of the real problem, and a convex sets, convex function and concave functions, polygons and vertex points and the optimization theory
2. Outline of the mathematical formulation of a linear programming problem
3. State a different ways to solve a problem of linear programming
4. Describe a sensitivity analysis for each problem.

-Apply a linear programming on some problems (transportation problems and network)

5. Define the duality problem of the primary problem and how to solve them

6. Enable students to form a mathematical model of some actual problems (mathematical formulation of the linear programming problems).

7. Explain the optimization theory and different ways to solve a linear programming problem

8. Create the duality problem and how to solve it, and sensitivity analysis for each problem

9. Apply a linear programming in solving some actual problem (and transportation problems and networks).

10. The ability to form groups and distribution of tasks

11. Presentation Skill in front of others

12. Skill constructive criticism, dialogue and discussion with others.

13. The ability to clearly express an opinion, and accept the opinions of others

References:

1. Linear Programming: Methods and Applications -Outline of Operations Research: Saul L,Gass. Dover publication: 2013 -0-456-43z64-x.
2. Introduction to Operations Resear. Frederick S. Hillier; Gerald J. Lieberman McGraw-Hill Science/Engineering: 2009- 10: 0077298349-0-07 729834-9-13: 9780077298340

Math 353 Mathematical Applications in Computer (2 Hours credit)

Course Format: one Hour of lecture and one hour of exercises per week, and additional 4 Hours of Discussion/self-study and office hours, at discretion of the instructor.

Prerequisite: Math203 and Math351

Description: The ability to make optimal use of technology in the consolidation of mathematical concepts

- The ability to deal with mathematical software and use them to solve problems.
- Conclusion skills and analysis
- The ability to write mathematical programs to solve mathematical problems using the computer
- Learn the skills of scientific research and oral recitation skills.

Objective:

Study of the basic skills of systems of doing mathematics by computer and basic skills of scientific presentation as follows:

The principles of the use of mathematical programs Mat lab and Mathematica for mathematical calculations and programming for calculus and linear algebra.

Outcomes:

1. Recognize the methods of finding limits and derivatives and integrals by computer
2. State the methods of solving linear algebra problems by computer and define the graphing techniques
3. Describe the methods of editing scientific researches and presentation skills
4. The students will **explain and interpret** a general knowledge of Calculus
5. Enable students to **analyses** the mathematical problems by mathematical software engines.
6. Student's ability to **write and present** scientific researches in a correct mathematical way

References:

1. Mathematical a system for doing mathematics by computer5th. Wolfram, Stephen. Addison-Wesley Publishing Company,Inc :2008-0-201-51502-4.
2. MATLAB PROGRAMMING. Y. KIRANI SINGH, B. B.CHAUDHURI Prentice-Hall of India :2007-978-81-203-8056-8.

Sixth level

Code Course	Course name	Credit Hour	Prerequisite	Reviews
MATH 322	Mathematical Methods	4(3+1+0)	MATH 321	
MATH 342	Group Theory	4(3+1+0)	MATH 241	
STAT302	Statistics and probability (2)	4(3+1+0)	STAT 201 +MATH 203	
MATH 381	Real Analysis (1)	3(2+1+0)	MATH 203	
---------	Department Elective	3(2+1+0)	---	
Total units		18		

Math342 Group theory (4 Hours credit)

Course Format: Three Hours of lecture and one hour of exercises per week, and additional 7 Hours of Discussion/self-study and office hours, at discretion of the instructor.

Prerequisite: Math241

Description: The axioms of group theory and some examples of groups- Subgroups- Cyclic groups- Lagrange theorem- Normal subgroup- Factor group- homomorphisms- Fundamental theorems of isomorphisms- Automorphisms- Caley theorem and its generalization- Simple groups- Permutation groups- Class equation- Group action on a set- P-groups- Cauchy theorem- Sylow's theorems- External and internal direct product of group- Burnside theorem- Dihedral- Quaternians- Groups of automorphisms on finite and infinite cyclic groups.

Objective: This course prepares the students to the theory of rings and fields which we can apply to many.

Outcomes:

1. State the axioms defining a group.
2. Deduce simple statements from these axioms.
3. Provide examples of groups.
4. Determine the image and the kernel of a group homomorphism.
5. State, prove and apply some of the classical theorems of elementary Group Theory.
6. State, prove and apply some of the classical theorems of symmetric groups and be able to deduce the table of any symmetric group and to decompose a permutation as a product of cycles of disjoint support and then to determine the order and the inverse of the given permutation.

7. Classify finitely generated Abelian groups.
8. The ability to recognize a group structure .
9. The ability to design new groups, to define their subgroups and to distinguish the normal ones .
10. The ability to make calculus with any permutation and to extract its principal properties.
11. To compare two group structures using the isomorphism theorems.
12. To discover that a group can be seen as a geometrical object (the action of a group on a set and representation.(
13. To understand that a finite group can be seen as a subgroup of the well known symmetric group Sn for a certain n.

References:

(1) Marshall Hall, Jr.: The Theory of Groups, Amer Mathematical, 1975.

(2) W. Ledermann , A. J. Wiet : Introduction to Group Theory, Publisher Longman , 1996.

(3) J. Rose: A course in group theory, Dover publications, Inc., 1994

Math 322 Mathematical Methods (4 Hours credit)

Course Format: Three Hours of lecture and one hour of exercises per week, and additional 7 Hours of Discussion/self-study and office hours, at discretion of the instructor.

Prerequisite: Math321

Description: Series Solutions of Ordinary differential equations with variable coefficients- Inner product space - self-adjoin operator- Sturm-Liouville theory- Orthogonal polynomials and special functions(Legendre, Hermit, gamma, beta, Bessel)- Generalized theory of Fourier series - Fourier integral ..

Objective:

1. Study of main concepts of Mathematical Methods as follows:

1. Solving Series Solutions of Ordinary differential equations with variable coefficients- Inner product space of functions

2. Studying the Improper integrals and its properties.

3. Studying Bessel function and its properties.

4. Studying Gamma and Beta functions, the relation between them and their properties..

5. Have the knowledge of Orthogonal polynomials and special functions (Legender, Hermite,).

6. Studying the generalized theory of Fourier series - Fourier integral.

7. Studying Laplace transformations and Inverse Laplace transformation.

8. Learning the Solution of differential equations using Laplace transforms

Outcomes:

1. **Define** and use the fundamental in Mathematical Methods such as: Series Solutions of Ordinary differential equations with variable coefficients- Inner product space of - self-adjoint operator- Sturm-Liouville theory- Orthogonal polynomials and special functions(Legendre, Hermit, gamma, beta, Bessel)- Generalized theory of Fourier series - Fourier integral

2. The students will **explain and interpret** a general knowledge of Mathematical Methods

3. The student should **illustrate** how take up responsibility

4. The student should **illustrate** how to Search the internet and using software programs to deal with problems.

5. The student should **appraise** how to Use the computer skills and library.

References:

1. Second Order Differential Equations: Special Functions and Their Classification. Gerhard Kristensson. Springer: 2010- 10: 0486656497- 13: 978-0486656496.
2. Fourier Analysis and its Applications. Geral B. F Fourier . Folland. Pacific Grove. Latest edition978-0821847909.

Stat302 Statistics and probability (4 Hours credit)

Course Format: Three Hours of lecture and one hour of exercises per week, and additional 7 Hours of Discussion/self-study and office hours, at discretion of the instructor.

Prerequisite: Math203 + Stat201

Description: Random vectors – Bivariate distributions, Joint probability mass function, joint probability densty function, Independence, conditional distributions, Expectation, Covariance, Correlation Coefficient, Variance of sum or difference of two random variables and the Moment Generating Functions of Bivariate Random Variables), Random samples – Distribution of sample mean – Law of large numbers

– Central limit theorem, Elementary statistical Inference - (estimation theory) – Methods and properties of point estimation - MLE.

Objective: On successful completion of the module, students:

a) will have a reasonable knowledge of probability theory and of the key ideas of statistical inference, in particular to enable them to study further statistics modules at levels 3 (for which this module is a pre-requisite);

b) Will have a reasonable ability to use mathematical techniques to manipulate joint, marginal and conditional probability distributions, and to derive distributions of transformed random variables;

c) Will have a reasonable ability to use mathematical techniques to calculate point and interval estimates of parameters and to perform tests of hypotheses;

d) Will have some appreciation of the relevance of mathematical statistics to real world problems.

Outcomes:

References:

(1) J. Freund and R.E. Walpole, Mathematical Statistics, 5th ed. , Prentice Hall Int. Inc , 1992.

(2) R. Yates and D. Goodman,Probability and Stochastic Processes.John Wiley & Sons. Inc 1999

Math 381 Real Analysis (1) (3 Hours credit)

Course Format: Three Hours of lecture and one hour of exercises per week, and additional 5 Hours of Discussion/self-study and office hours, at discretion of the instructor.

Prerequisite: Math203

Description: Basic properties of the field of real numbers-completeness axioms, Series of real numbers and their convergence-monotone sequences, Bolzano Weirstrass theorem –Basic topological properties of the real line, Limit of a function-continuous and uniform continuous functions and their properties, Compact sets and their properties-The derivative of a real valued functions, Related theorems to the differentiation of a real (Rolle –Taylor and the mean value theorems).

Objective: Study of the main and basic concepts of real analysis as follows:

1. Studying different basic properties of the field of real numbers.
2. Studying the completeness axioms.

3. Have the knowledge of the notion of Series of real numbers and their convergence and monotone real numbers sequences.

4. Have the knowledge of Bolzano –Weirstrass theorem and its applications..

5. Have the knowledge of basic topological properties of the real line.

6. Studying the concept of the limit of a real valued function.

7. Have the knowledge of the continuous and uniform continuous real valued functions

8. Studying the notion of compactness on the set of real numbers.

9. Have the knowledge of the differentiability of real valued functions and related theorems.

10. Acquiring the techniques and skills in solving different problems

Outcomes:

1. D**efine** the basic and topological properties of the field of real numbers
2. D**efine** the basic and topological properties of the field of real numbers
3. The students will **explain and interpret** a general knowledge of Real Analysis.
4. Enable students to **analyze** the mathematical problems
5. The student should **illustrate** how take up responsibility
6. The student should **appraise** how to Use the computer skills and library.

References:

[1] R. Bartle and D. Sherbert : Introduction to Real Analysis , John-Wiley & Sons , New York (Recent Edition) .
[2] J. Mikusiuski and P. Mikusiuski : An Introduction to Analysis , John Wiley , New York , 1993.
[3] W. Rudin : Principles of Mathematical Analysis , McGraw-Hill Inc , New York , 1966

Seventh level

Code Course	Course name	Credit Hour	Prerequisite	Reviews
MATH 423	Partial Differential Equations	4(3+1+0)	MATH 321	
MATH443	Rings and Fields	3(2+1+0)	MATH 342	
MATH 472	Introduction to Topology	3(2+1+0)	MATH 381	
MATH 473	Introduction to Differential Geometry	4(3+1+0)	MATH 241 +MATH 204	
SALM 103	Economic system in Islam	2(2+0+0)	SALM 101	
-------	Department Elective	2(2+0+0)	---------	
-------	Field training	0	Pass 100 Units	
Total units		18		

Math473 Introduction to Differential Geometry (4 Hours credit)

Course Format: Three Hours of lecture and one hour of exercises per week, and additional 7 Hours of Discussion/self-study and office hours, at discretion of the instructor.

Prerequisite: Math204 and Math241

Description: Theory of curves in R^3-Regular curves - arc length and reparametrization –Natural parametrization- Serret-Frenet equations – Existence and uniqueness theorem for space curves-Bertrand curves- Involutes and evolutes-Local theory of surfaces-Simple surfaces-Coordinate transformations-Tangent vectors & tangent spaces - First and second fundamental forms– Normal and geodesic curvature – Weingarten map- Principal Gaussian and mean curvatures-Geodesics- Equations of Gauss and Godazzi-Mainardi

Objective:

1. knowing the theory of curves in R^3-Regular curves - arc length and reparametrization- Natural parametrization – Curvature and Torsion - Serret-Frenet equations
2. Recognizing the Local theory of surfaces-Simple surfaces-Coordinate transformations-Tangent vectors & tangent spaces - First and second fundamental forms
3. Knowing the Normal and geodesic curvature – Weingarten map- Principal Gaussian and mean curvatures- Geodesics- Equations of Gauss and Godazzi-Mainardi.

Outcomes:

1. Define Regular curves - arc length and reparametrization-

2. Outline theory of curves in R^3- the Local theory of surfaces-Simple surfaces-Coordinate transformations-

4. State Tangent vectors & tangent spaces - First and second fundamental forms

5. Recall Weingarten map- Principal Gaussian and mean curvatures- Geodesics

6. Define Natural parameterization – Curvature and Torsion - Serret-Frenet equations

7. Recognize the Normal and geodesic curvature - Equations of Gauss and Godazzi-Mainardi.

8. Explain how to find the curvature and torsion of the curve

9. Summarize the theory of curves, simple surfaces and Serret Frenet equations.

10. Explain the plotting of curves and surfaces with determining the main properties of them.

11. Applied Weingarten map and geodesics.

12. Interpret the nature parameterization, first and second fundamental forms to surfaces.

13. Analyze mathematical programs as matlab to plot different curves and surfaces.

References:

1. First Steps in Differential Geometry: Riemannian, Contact, Simplistic. Andrew McInerney. Springer :2010-B00E3BWGZE.
2. Differential Geometry. Erwin Kreyszig Dover Publications,1991-0486667219,9780486667218.

Math472 Introduction to Topology (3 Hours credit)

Course Format: Two Hours of lecture and one hour of exercises per week, and additional 5 Hours of Discussion/self-study and office hours, at discretion of the instructor.

Prerequisite: Math381

Description: Definition of topological spaces – open sets and interior operator – limit points – closed sets and closure operator – cluster points – isolated points – operators and neighborhoods – relative topology- product of topological spaces Definition of continuous functions - open and closed functions - homeomorphisms – topological property - separation axioms - Hausdroff and Lenz separation axioms-

definition of compactness – continuous functions and compactness– compactness and separation axioms - dense sets .

Definition of connectedness - connectedness and continuous functions - connectedness and compactness- components – metric spaces

Objective: 1. Studying Topological Spaces- Examples-closure of a set-derived set on them.

2. Studying the Topological subspaces- Bases –finite product topology- and their properties.

3. Solving subbases- Metric spaces examples- metrizability-Continuous functions – characterization of continuous functions on topological.

4. Have the knowledge of the metric spaces –homeomorphismsexamples-Topological property- Compact spaces.

5. Have the knowledge of Examples – Limit point and sequentially.

6. Have the knowledge of compact spaces and their properties.

7. Studying connected spaces.

Outcomes:

1. D**efine** the fundamental in Topological Spaces- Examples-closure of a set-derived set and Topological subspaces- Bases –finite product topology- subbases- Metric spaces – examples. Also Metrizability-Continuous functions –characterization of continuous functions on topological and Metric spaces homeomorphisms examples-Topological property .Also compact and connected are introduced

2. **Outline** the logical thinking

3. The students will **explain and interpret** a general knowledge of general topology

4. Enable students to **analyses** the mathematical problems.

5. The student should **illustrate** how take up responsibility.

6. The student should **illustrate** how to communicating with: Peers, Lecturers and Community

7. The student should **appraise** how to Use the computer skills and library

References:

1. combinatory course in topology 7th.Mark de ongueville. Springer science+ Business Media: 2011 -978-1-1-4419-7909-4.
2. Topology (2nd Edition). James Munches Pearson: 20000-13-181629-2

Math 443 Rings and Fields (3 Hours credit)

Course Format: Two Hours of lecture and one hour of exercises per week, and additional 5 Hours of Discussion/self-study and office hours, at discretion of the instructor.

Prerequisite: Math342

Description: Rings and group of units of a ring. Group of auto Orphisms of a ring. Ideals and the quotient rings. Principal rings. Prime and Maximal ideals. Field of quotients of an integral domain. Characteristic of a ring. Direct sum of rings. Modules over a ring. Euclidian rings. The ring of polynomials A[X1,X2,...,Xn] over a ring A. Roots of polynomials over a Field K. Extension of fields. Simple and finite extensions of fields. Splitting fields and Algebraic Closures. Finite fields.

Objective: - On successful completion of the module, students should be able to:

Determine the ideals of a given ring

1. Determine the factor ring of a ring modulo an ideal.
2. Determine the splitting field of a polynomial.
3. Characterize prime and maximal ideal in many particular rings.
4. To establish that two rings are isomorphic
5. Prove that a ring is a field.
6. Determine the ideals of a factor ring
7. Easily work with polynomials as element of A[X]
8. To practice the Euclidian division in K[X] and determine the gcd lcm of polynomials.
9. Do calculations inside a finite field.
10. Construct finite fields from a field of polynomial over a finite field and an irreducible polynomial.
11. Draw the table of $F_p[X]/<P(X)>$.

Outcomes:

1. State the axioms defining a ring, Integral domain , invertible element , a field, an ideal, prime and maximal ideals and consequences.
2. Deduce simple statements from these axioms.
3. Provide examples of different simple ring structures.
4. Determine the image and the kernel of a ring homomorphism.

5. State, prove and apply some of the classical theorems of elementary Rings and Fields Theory.
6. Apply Bezout's theorem and Gauss's theorem in Euclidian ring in particular K[X].
7. Construct new finite fields in view to be applied to coding and cryptography.
8. Study the extension of fields

9. The ability to recognize a ring, ideal and field structure .

10. The ability to design new rings by constructing factor ring, to define their ideals and to distinguish the principal, the prime and the maximal ones .

11. To have the ability to construct integral domain as a factor of a ring by a prime ideal, and a field as a factor ring of a ring by a maximal ideal .

12. The ability to make calculus the ring of polynomials and to be able to determine the gcd of two polynomial and to determine if they are coprime using Bezout's theorem or any related theorem.

13. To be able to apply Gauss's theorem and in some cases to determine the roots of a polynomial.

14. To be able to manipulate the principal ring ،

15. To be able to construct finite fields as a factor ring of polynomials on finite field by an irreducible ideal .

16. To be able to draw the tables of F_pn[X]/<P>

References:

1. Groups, Rings and Fields. J David A.R. Wallace. Springer : 2001-0-3540761772-13: 9783540761778.
2. Introduction to Finite Fields and their Applications. R. Lidl and H. Niederreiter. Cambridge University Press :1994 9781139172769-9780521460941

Math423 Partial Differential equations (4 Hours credit)

Course Format: Three Hours of lecture and one hour of exercises per week, and additional 7 Hours of Discussion/self-study and office hours, at discretion of the instructor.

Prerequisite: Math231

Description: First order linear partial differential equation, Solution using Lagrange's method, Cauchy problem, Second order linear P.D.E in several variables, Physical application using separation of variables. Classifications of P.D.E., Integral

transforms (Fourier and Laplace transforms) and there applications to P.D.E, Green's function.

1. **Objective:** A Study of main concepts of Partial Differential Equations as follows:

1. Studying First order linear partial differential equation.
2. Studying Cauchy problem.
3. Solving by using Lagrange's method.
4. Have the knowledge of Second order linear P.D.E in several variables.
5. Have the knowledge of Physical application using separation of variables.
6. Have the knowledge of Integral transforms (Fourier and Laplace transforms) and there applications to P.D.E.

Outcomes:

1. D**efine** the fundamental in Partial Differential Equations such as: Solution using Lagrange's method
2. **Outline** the logical thinking
3. The students will **explain and interpret** a general knowledge of Partial Differential Equations
4. The student should **illustrate** how take up responsibility
5. The student should **illustrate** how to communicating with: Peers, Lecturers and Community.

References:

Fourier analysis and its Applications, Geral B. F Fourier Folland, Pacific Grove, 1992.

Level Eight

Code Course	Course name	Credit Hour	Prerequisite	Reviews
.....	Department Elective	3(2+1+0)	.....	
MATH 483	Complex Analysis	4(3+1+0)	MATH 381	
MATH 484	Introduction to functional analysis	3(2+1+0)	MATH 472	
---	University Elective	2(2+0+0)		
MATH 499	Project	4(2+2+0)	Pass 100 units	
---	Free course	2(2+0+0)		
Total units		18		

Math484 Introduction to Function Analysis (3 Hours credit)

Course Format: Two Hours of lecture and one hour of exercises per week, and additional 5 Hours of Discussion/self-study and office hours, at discretion of the instructor.

Prerequisite: Math472

Description: This course is concerned with the studying of the different spaces such as the metric space-the linear space-the normed space-Banach space-the inner product space-Hilbert space and considering the different basic theorems.

Objective: Study of main concepts of functional analysis as follows:

1. Studying different types of spaces in analysis.
2. Studying the spaces properties such as basic theorems.
3. Solving some examples on these spaces which clarify its basic concepts.
4. Have the knowledge of the inner and Hilbert spaces.
5. Have the knowledge of Linear operators and functional on these spaces
6. Acquiring the analysis technique in solving different problems.

Outcomes:

1. **Define** the fundamental notions in Functional Analysis such as: Definitions of different types of spaces and its properties-complete metric spaces
2. The students will **explain and interpret** a general knowledge of Functional Analysis
3. The student should **illustrate** how take up responsibility.
4. The student should **illustrate** how to communicating with: Peers, Lecturers and Community.
5. The student should **appraise** how to Use the computer skills and library
6. The student should **illustrate** how to Search the internet and using software programs to deal with problems.

References:

1. Functional Analysis-Introduction to further topics in Analysis. Elias M .Stein and rami Shakarchi. Princeton University Press2011-9780691113876.
2. Introductory Functional Analysis with ApplicationsErwin Kreyszig. John Wiley and Sons:1978-0471507318, 9780471507314

Math 499 Project (3 Hours credit)

Credit Option: Allowed after completion of 100 credit Hours

Prerequisite:

Description: A student prepares a research project in one of the Math. Topics under the supervision of the staff. The student should submit a report for an oral exam. This course is designed to give the student research skills and apply some mathematical methods studied in previous courses for processing theoretical and applied problems. Teach students required skills of writing research - providing students with the skill of self-search for a topic in mathematics - student learning some actual applications of sports topics - writing and presentation skills.

Objective:

Outcomes:

References:

Determined by the student's supervisor

Math 483 Complex Analysis (4 Hours credit)

Course Format: Three Hours of lecture and one hour of exercises per week, and additional 7 Hours of Discussion/self-study and office hours, at discretion of the instructor.

Prerequisite: Math381

Description: Complex Numbers - Cartesian and polar representation of complex numbers- powers and roots of complex numbers- Limits and continuity of complex functions-Analytic functions -Cauchy- Riemann equations. Harmonic functions. Exponential, trigonometric - hyperbolic functions and logarithmic functions- Complex Integration- contour integral -Cauchy's theorem- Cauchy's integral formula. Bounds on analytic functions -Taylor and Laurent series-Power series- Zeros and singularities- Residue theory-Applications to real and improper integrals..

Objective: This Course aims to provide students with various kinds of complex analysis. On completing this module, student should Understanding to use complex calculus in various situations. The student has the knowledge of

1- Complex numbers and their properties, polar form of a complex number, power and roots of a complex number, De Moivre formula. Exponential notation. Complex Exponential Function. The equation exp(z) = 1.
2- Trigonometric and hyperbolic Functions. The zeros of trigonometric and hyperbolic function in C.
3- Real part and imaginary part of a complex function. Continuity of a complex function. IR-derivability and C-derivability of a complex function at a point. Cauchy-Riemann Conditions. Holomorphic function in an open part of C. Hamonic function.
4- Examples of holomorphic function: function defined by a power series. Maximum principle for a holomorphic function and a harmonic function.
5- Complex integral on a path of a complex Function. Primitive of a complex function.
6- Cauchy s theorem for a triangle, Cauchy s theorem for a star-shaped domain. Cauchy s integral formulas and applications. Taylor series of a holomorphic function.
7- Zeros of a holomorphic function. Isolated singularity of a complex function. Pole of a complex function. Laurent series near a pole. Residue.
8- Residue theorem in a star-shaped domain. Application: Evaluation of real trigonometric and real improper integrals. Conformal mappings, linear Fractional Transformation. Dirichlet problem.

Outcomes:

References:

1. Complex Analysis. Joseph Back. Springer: 2010978-1-4419-7288-0.
2. Complex Variables and Application (8^{th} edition). Ruel V. Churchill & James Brown. McGraw-Hill :2008-10: 0073337307-13: 978-0073337302

Mathematics Option and elective courses Description

code	Course name	Credit Hour	Pre-Requisite	Co-Requisite
MATH344	Number Theory	2(2+0+0)	MATH231	
MATH332	Graph Theory	2(2+0+0)	MATH231	
MATH345	Linear Algebra 2	2(2+0+0)	MATH241	
MATH433	Mathematical logic	2(2+0+0)	MATH231	
MATH485	Fourier Analysis	2(2+0+0)	MATH423 +MATH483	
MATH334	Discrete Mathematics	3(2+1+0)	MATH231	
MATH454	Optimization Technique	3(2+1+0)	MATH352	
MATH405	Calculus of Variation	3(2+1+0)	MATH321	
MATH482	Real Analysis 2	3(2+1+0)	MATH 381	
MATH335	Mathematics History	2(2+0+0)	MATH231	
MATH412	Topics in Applied Mathematics	3(2+1+0)	MATH321	
MATH311	Financial Mathematics	2(2+0+0)	MATH202	
MATH455	Numerical Analysis 2	3(2+1+0)	MATH351	
STAT404	Data Analysis	2(2+0+0)	STAT302	
STAT303	Inventory Models	2(2+0+0)	STAT302 +MATH 352	

Math412 Topics in applied mathematics (3 Hours credit)

Course Format: Two Hours of lecture and one hour of exercises per week, and additional 5 Hours of Discussion/self-study and office hours, at discretion of the instructor.

Prerequisite: Math321

Description: the Kinematic of particles in one-dimensional, and 2-3 dimensional, and solve some problems on it, Velocity and acceleration in polar coordinates in a plane, and solve some examples and problems on it, The kinetic of particles in 1-2 dimension- kinetic of particle in the plane, some examples and solve problems on it, Projectiles, the movement of projectiles at horizontal plane, the movement of projectiles at oblique, simple harmonic motion work and energy, and solve some examples and Solve also some problems on it, Fundamental in Fluids Mechanics-Kinematics of fluid-velocity, pressure, Density, incompressible fluid, steady-unsteady motion, Streamlines, Euler's-Lagrange's methods Vortex line, Circulation Solve

some problems on it, The equation of continuity and potential velocity, cuette solve some examples and problems on it.

Objective: Study of main concepts of Subjects in Applied Mathematics as follows:

1. Studying the Kinematic of particles in one-dimensional, and 2-3 dimensional.
2. Studying the Kinetic of particles in 1-2 dimensional.
3. Solving Examples and some problems on Kinematic and Kinetic of particles.
4. Have the knowledge of Fundamental in Fluids Mechanics-Kinematics of fluid-velocity, pressure, Density, incompressible fluid, steady-unsteady motion, Streamlines, Euler's-Lagrange's methods…
5. Have the knowledge of vortex line, Circulation.
6. Have the knowledge the equation of continuity and potential.
7. Studying the cuette flow.

Outcomes:

1. D**efine** the kinematic of particle, kinetic of particle, motion in 2-3 dimension, coordinates in 2-3 dimensional, projectiles, movement of projectiles at the horizontal plane and oblique, work and energy, simple harmonic motion, Fundamental in Fluids Mechanics-Kinematics of fluid-velocity, pressure, Density, incompressible fluid, steady-unsteady motion, Streamlines, Euler's-Lagrange's methods, Vortex line, Circulation the equation of continuity and potential velocity.
2. S**tate** the physical problems by mathematical method
3. **Outline** the logical thinking
4. The students will **explain and interpret** a general knowledge of subjects in applied mathematics.
5. The student should **illustrate** how take up responsibility
6. The student should **illustrate** how to Search the internet and using software programs to deal with problems.

References:

1. Introduction to Theoretical and Computational fluid dynamics. C. Pozrikidis. Oxford University 2011-10: 0199752079 13: 978-0199752072.
2. Mathematical Methods in the Physical Sciences. Mary L. Boas. Johan Wiely, Sons , Inc. 1995-0-471-29,027-4-13: 978-0-471-29,027-0

Math 842 Real analysis 2 (3Hours credit)

Course Format: Two Hours of lecture and one hour of exercises per week, and additional 5 Hours of Discussion/self-study and office hours, at discretion of the instructor.

Prerequisite: Math381

Description: Definition of Riemann integral- Darbo theorem and Riemann sums - Properties and the principle theorem in calculus. Sequence Series of functions- Poi twice convergence and uniform convergence- Algebra and (sigma algebra)- Finite additive and countable additive- Main extension theorem and outer measure- Measurable sets - Measure - Lebesgue measure and its properties- Simple functions- Measurable functions- Lebesgue integral- Theorems of convergence- The relation between Lebesgue and Riemann integral.

Objective: Study of main concepts of Real analysis as follows:

1. Studying Definition of Riemann integral- Darboux theorem and Riemann sums and operations on them.
2. Studying the Properties and the principle theorem in calculus. Series of functions and their properties.
3. Solving system of Pointwice convergence and uniform convergence- Algebra and algebra (sigma algebra).
4. Have the knowledge of the Finite additivity and countable additivity- Main extension theorem and outer measure.
5. Have the knowledge of Measure - Lebesgue measure and its properties- Simple functions.
6. Have the knowledge of Theorems of convergence and their properties.
7. Studying determinants and operations on relation between Lebesgue and Riemann integral.

Outcomes:

1. **Define** the fundamental in linear real analysis as:
Definition of Riemann integral- Darboux theorem and Riemann sums - Properties and the principle theorem in calculus. Series of functions- Pointwice convergence and uniform convergence- Algebra and □□– algebra (sigma algebra)- Finite additivity and countable additivity- Main extension theorem and outer measure- Measurable sets - Measure - Lebesgue measure and its properties- Simple functions-

Measurable functions- Lebesgue integral- Theorems of convergence- The relation between Lebesgue and Riemann integral.

2. **State** the physical problems by mathematical method

3. Enable students to **analyses** the mathematical problems

4. The student should **illustrate** how take up responsibility

References:

1. Introduction to Real Analysis. William F. Trench. Hyperlinked Pearson Education: 2012-0-13-045786-8.
2. Real Analysis (4th Edition) H. Royden, P. Fitzpatrick Macmillan Publishing Co., Inc. New York: 2010 10:01314374x-13: 978-0131437470

Math 344 Number Theory (2 Hours credit)

Course Format: Two Hours of lecture per week, and additional 4 Hours of Discussion/self-study and office hours, at discretion of the instructor.

Prerequisite: Math231

Description: First and second principle of Mathematical Induction- Well–ordering principle – Divisibility- Euclidean Algorithm. Primary Numbers and their properties- Linear Diophantine Equations- Congruence's and their properties- linear Congruence's- The Chinese Remainder Theorem- Fermat's little theorem- Euler's theorem-Wilson's theorem- Arithmetic functions- Pythagorean triples

1. **Objective:** 1 Study of main concepts of Number Theory as follows:

1-First and second principle of Mathematical Induction-

2-Well–ordering principle –

3- Divisibility- Euclidean Algorithm.

4-Primary Numbers and their properties-

5-Linear Diophantine Equations-

6-Congruence and their properties-

7-linear Congruence's-

8-The Chinese Remainder Theorem-

9-Fermat's little theorem-

10-Euler's theorem-Wilson's theorem-

11-Arithmetic functions-

12-Pythagorean triples.

Outcomes:

1. **Define** and use the fundamental in Number Theory such as: the basic concepts and properties of the integers and reliable in the study of abstract algebraic concepts,. Acquiring knowledge by learning theories, and basic concepts in the theory of numbers. The ability of students to apply the basic principles of the theory of numbers that they have learned in this course to solve some numerical problems. The ability to identify appropriate analytical procedures to find the right solution for some of the problems of life.
2. **State** the physical problems by mathematical method.
3. The students will **explain and interpret** a general knowledge of Number Theory.
4. Student's ability to **write** and solve physical equations in a correct mathematical way
5. The student should **illustrate** how take up responsibility

References:

1. Elementary number theory and its Applications 6th Edition. Kenneth H.Rosen. Addison-Wesley publishing company. NewYork: 2010- 13: 978-0321500311.
2. Elementary Number Theory. Gareth A. Jones and Josephine M. Jones. Springer: 1998- 3-540-76197-7.

Math 311 Financial Mathematics (3 Hours credit)

Course Format: Two Hours of lecture and per week and one hour of exercise, and additional 5 Hours of Discussion/self-study and office hours, at discretion of the instructor.

Prerequisite: Math202

Description: Pricing – Tax – Insurance – Benefits – Annual Payments – Amortization – Investment. Introduce students to math and use of financial management in banks and business and trade. Studying of the application of mathematical methods in the treatment of the problems faced by the community in the fields of finance, such as the stock market and banks and investment areas

Objective:

دراسة تطبيق الطرق الرياضية في علاج المشكلات التي تواجه المجتمع في المجالات المالية مثل البورصة والبنوك والمجالات الإستثمارية .

References:

1. Pacification of Options Futures and Other Derivatives (With CD) 7th Edition. John C Hull, Sankarshan Basu. Pearson

Math 454 Optimization techniques (3 Hours credit)

Course Format: Two Hours of lecture and per week and one hour of exercise, and additional 7 Hours of Discussion/self-study and office hours, at discretion of the instructor.

Prerequisite: Math352

Description: Basic concepts for optimality- Convex &concave functions- Quadratic Forms- Optimality of unconstrained nonlinear functions in one or several variables- Hessian matrix- Optimality of nonlinear functions with equality constraints- Direct substitution method- Lagrangian multipliers method- Optimality of nonlinear functions with inequality constraints – Kuhn –Tucker conditions- Quadratic Programming.

Objective: A - Identify the basic concepts of optimization.

B - Identify the convex and concave functions and quadratic forms.

C - Solving the problems of optimization for non-linear functions in one variable or multiple variables is restricted and how to use the Hessian matrix in Egged solution.

D – Methods for solving the optimization problems of nonlinear functions with constrained equations (direct method –Lagrange multiplier).

E - Solving the optimization problems for non-linear functions with inequality constraints .

- Identify Kuhn - Tucker conditions and quadratic forms.

References:

1- Nonlinear Programming: Theory and Algorithms [Hardcover. Mokhtar S. Bazaraa. John Wiley and. Sons Ltd :2013-10-0-471-48600-0-13: 978-0471

2. Introduction to the Theory of Nonlinear Optimization. Jahn, Johannes. Springer: 2007-978-3-540-49379-2

Math405 Calculus of variation (3 Hours credit)

Course Format: Two Hours of lecture and one hour of exercises per week, and additional 7 Hours of Discussion/self-study and office hours, at discretion of the instructor.

Prerequisite: Math321

Description: Extremum of a function of many variables (absolute and conditional extremum), The Functional - The variation of a functional and its properties, The elementary problem in the calculus of variations- Euler's equation- Generalizations of the elementary problem of the calculus of variations - Field of Extremals, Sufficient conditions for the extremum of a functional – conditional extremum- moving boundary problems, The Hamilton-Jacobi theory- the variation principles of Mechanics, Some applications

References:

1- An Introduction to the Calculus of Variations. Charles Fox. Dover Publications: 2010-10: 0486654990-13: 978-0486654997

2- Introduction to the Calculus of Variations. Bernard Dacorogna. Imperial Faculty Press; 2 edition: 2008 10: 1848163347-13: 978-1848163348.

Math485 Fourier Analysis (2 Hours credit)

Course Format: Two Hours of lecture per week, and additional 7 Hours of Discussion/self-study and office hours, at discretion of the instructor.

Prerequisite: Math483

Description: Topological vector spaces: Definitions, semi- norms and their induced topologies- criteria for continuity of semi-norms and linear maps- Schwartz space- continuity of - Tempered distributions: the space - differentiation of distributions and multiplication by functions of slow increase - examples. Fourier analysis : Fourier transform on- main properties - Fourier inversion theorem- Plancheral formula- Fourier transform on - properties -weak topology of - Fourier series in - convolutions and continuity properties - compatibility - Riemann-Lebesgue lemma - the space . Density theorems: the space - density of in - the space - approximations to - approximations in .Sobolev spaces: definition of - Fourier transform when - properties

References:

1- Fourier analysis. T. W. Körner. Cambridge University Press :1989-10: 0521389917-13: 978-0521389914

2- Fourier analysis and Its Applications. Gerald B. Folland American Mathematical Society: 2009- 10: 0821847902 13: 978-0821847909.

Math334 Discrete mathematics (3Hours credit)

Course Format: Two Hours of lecture and one hour of exercises per week, and additional 7 Hours of Discussion/self-study and office hours, at discretion of the instructor.

Prerequisite: Math231

Description: Sentential Calculus- Logical Equivalence-Arguments- Methods of Proof-Relations- Equivalence Relations- Order Relations- Boolean Algebras – Logic Circuit- Graph Theory- Connected Graph-Isomorphic Graph- Planar Graph- Trees.

References:

1- Discrete Mathematics and Its Applications 5 edition. Kenneth H. Rosen. McGraw-Hill. Science/Engineering/Math;:2003-10: 007293033013: 978-0072930337

2- Discrete Mathematics, 7th Edition.Richard Johnsonbaugh.Pearson: 2007-10: 0131593188-13: 978-0131593183.

Math332 Graph Theory (2 Hours credit)

Course Format: Two Hours of lecture and per week, and additional 7 Hours of Discussion/self-study and office hours, at discretion of the instructor.

Prerequisite: Math231

Description: Introduction to graph theory, Basic concepts (complete graphs- sub graphs- spanning sub graphs n-partite graphs complete bipartite graphs – complementary graphs)- Operations on graphs- Sequences and graphs- Matrices and graphs- Paths, circuits, cycles and connected graphs- Eulerian and Hamiltonian graphs- Trees- minimal spanning trees-Planar and non-planar graphs- Graph-Graph coloring (complete graphs- Trees – Cubes – partite graphs-Applications-shortest path problem

References:

1- Introduction to Graph Theory; 2nd editionRichard J. Trudeau, Dover Publications;: 1994-10: 048667870913: 978-0486678702.
2- Introduction to Graph Theory (2nd Edition). Douglas B. West. Pearson: 2000-10: 013014400213: 978-0130144003.

Math345 Linear algebra (2) (2 Hours credit)

Course Format: Two Hours of lecture per week, and additional 7 Hours of Discussion/self-study and office hours, at discretion of the instructor.

Prerequisite: Math241

Description: Triangular matrix- Caley-Hamilton theorem- Characteristic polynomials-Eigen values &Eigen vectors- Danvour analysis- The Jordan form- Function of a matrix- Properties of e^A - Linear differential equations with constant coefficients and the exponential e^{At}

References:

1- Linear Algebra. Jim Hefferon. Virginia Commonwealth. University Mathematics: 2009- 10: 0982406215- 13: 978 0982406212
2- Elementary Linear Algebra. Howard Anton. John Wiley & Sons; 8th Edition: 2000- 10: 0471170550 13: 978-0471170556.

Math433 Mathematical Logic (2 Hours credit)

Course Format: Two Hours of lecture and per week, and additional 7 Hours of Discussion/self-study and office hours, at discretion of the instructor.

Prerequisite: Math231

Description: Propositional calculus. The deduction theorem for propositional calculus- Completeness and consistency of propositional calculus. Predicate calculus- First-order theorems- Consistency of first-order predicate calculus- Completeness theorem for predicate logic. Applying the concepts of mathematical structures in resolving issues in other fields such as computer science. Applying the concepts of mathematical structures in resolving issues of fact. Choosing and applying appropriate methods of proof in a particular case.

References:

1- A Mathematical Introduction to Logic, Second. Edition. Herbert Enderton , Herbert B. Enderton academic Press: 2001-10: 0122384520-13: 978-0122384523

2- Mathematical Logic. Stephen Cole Kleene. Dover Publications: 2002-10: 0486425339 13: 978-0486425337.

Math 404 Data Analysis (2 Hours credit)

Course Format: Two Hours of lecture per week, and additional 7 Hours of Discussion/self-study and office hours, at discretion of the instructor.

Prerequisite: Math302

Description: Review, random experiment, random variable

Random sampling and its methods , normal distribution , t- distribution- Distribution of the sample mean, sampling from two populations, testing hypothesis about the population mean, - The analysis of variance , ANOVA - Goodness of fit – chi- square test, - fixed and random factors- testing hypothesis about correlation coefficient - SPSSor MINITAB Statistics Software Packages.

References:

1- Applied Statistics and Probability for EngineersDouglas C. Montgomery, George C. Runger. Wiley; 4 edition: 2006- 10: 0471745898-13: 978-0471745891.

2- Statistical Data Analysis. Glen Cowan Oxford University Press, USA: 1998-10: 019850155213: 978-0198501558.

Stat 352 Inventory Models (2 Hours credit)

Course Format: Two Hours of lecture per week, and additional 7 Hours of Discussion/self-study and office hours, at discretion of the instructor.

Prerequisite: Stat303

Description: General introduction- Importance of Inventory Control – deterministic models- Economic order quantity (EOQ) - Reorder Point (ROP) - inventory models for single item and multiple items - Some dynamic inventory models – EOQ Without the Instantaneous Receipt Assumption. Quantity Discount Models- Use of Safety Stock. Dependent Demand. Some probabilistic inventory models - Dynamic optimization of inventory scheduling. – Lead-time demand

Normally distributed. - Other distributions for the Lead-time demand; EOQ as a special case. Constrained Inventory models. Optimal solution using geometric programming and Lagrangian multiplier techniques.

References:

1- Principles of Inventory and Materials Management (4th Edition). Richard. J. Tersine. Prentice Hall : 1993- 10: 0134578880- 13: 978-0134578880

2- Operations Research: An Introduction (9th Edition). Hamdy A. Taha. Prentice Hall : 2010-10: 013255593X- 13: 978-0132555937

Math 335 History of Mathematics (2 Hours credit)

Course Format: Two Hours of lecture per week, and additional 7 Hours of Discussion/self-study and office hours, at discretion of the instructor.

Prerequisite: Math231

Description: Evolution of some mathematical concepts, facts and algorithms in arithmetic -algebra, trigonometry-Euclidean geometry-analytic geometry and calculus through early civilizations-Egyptian-Babylonians-Greeks-Indeans-Chinese-Muslims and Europeans – Evolution of solutions of some conjectures and open problems

References:

1- A History of Mathematics, Second Edition. Carl B. Boyer, Uta C.Merzbach , Isaac Asimov.Wiley: 1991-10: 047154397713: 978-0471543978

2- A Concise History of Mathematics: Fourth.Revised Edition.Dirk. J. Struik. Dover Publications: 1987-10: 0486602559-13: 9780486602554.

Math455 Numerical Analysis 2 (3 Hours credit)

Course Format: Two Hours of lecture and one hour of exercises per week, and additional 7 Hours of Discussion/self-study and office hours, at discretion of the instructor.

Prerequisite: Math351

Description: Advanced Numerical methods with computer applications-approximation theory – polynomial approximations- Chebyshev polynomials-trigonometric polynomials-rational function approximation - least square problems-Direct methods for large and sparse linear and nonlinear systems- backward error

analysis-Numerical methods for solving ordinary differential equations- solving partial differential equations by finite differences and finite elements methods.

Objective:

1. Numerical analysis has the twin aims of producing efficient algorithms for approximation, and the analysis of the accuracy of these algorithms.
2. Distinguish between discrete data and continuous function.
3. Formulate orthogonal and orthonormal polynomials.
4. The form of the function f(x) which permits the use of Chebyshev polynomials as approximation to it.
5. Interpolation using Chebyshev polynomials and compute the error table from the approximation.
6. Distinguish between Initial Value Problem and Boundary Value Problem
7. Define a Boundary Value Problem (BVP) involving a partial differential equation.
8. Solve BVP and PDE using a finite element method.
9. Solve ordinary differential equation.
10. Test and verify the correctness of your own codes using simple model problems and principles from theory.
11. Be able to read/study the literature and use basic software packages on numerical approximation. Be exposed to research issues in parallel numerical computing.

Outcomes: By the end of the module students will:

1. be able to solve novel and/or complex problems in Approximation Theory and Solution of Ordinary Differential Equations. Have acquired a coherent body of knowledge of these subjects demonstrated through one or more of the following topic areas: Consistency, convergence and linear stability of numerical methods. One-step methods. Linear multi-step methods. Approximation theory. Chebyshev polynomials, trigonometric polynomials approximation and rational function approximation. Solving partial differential equations by finite differences and finite elements methods.

2. State the physical problems by mathematical method

3. The students will explain and interpret a general knowledge of Numerical Analysis.

4. Enable students to analysis the mathematical problems.

5. The student should take up responsibility

6. The ability of working independently and with groups

7. The student should illustrate how to communicating with: Peers, Lecturers and Community

8. The student should interpret how to Know the basic mathematical principles using the internet

9. The student should appraise how to Use the computer skills and library.

10. The student should illustrate how to Search the internet and using software programs to deal with problems.

References:

1- Numerical Methods.Fourth Edition. J. Douglas Faires, Richard L. Burden. Cengage Learning : 2012-0495114766, 9780495114765.

2- Numerical Methods for Engineers, Steven Chapra , Raymond Canale. McGraw-Hill Science/Engineering/Math: 2009-10: 0073401064

FACULTY MEMBERS, ASSISTANTS AND STAFF

1

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Academic rank: Professor

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Interest area: Functiona Analysis and Algebra

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Specialization: Mathematics

Interest area: Fluid Mechanic

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Academic rank: Professor

Specialization: Mathematics

Interest area: complex analysis

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Specialization: Pure Mathematics

Interest area: Functional Analysis

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Specialization: Mathematics

Interest area: Mathematical Statistics

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Specialization: Mathematics

Interest area: Pure Mathematics

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Specialization: Mathematics

Interest area: Functional Analysis

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Interest area: Topology

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Interest area: Operations Researches

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Interest area:

11

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Specialization: Pure Mathematics

Interest area: Mathematical Analysis

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Specialization: Mathematics

Interest area: Rough Sets Theory

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Specialization: Mathematics

Interest area: Topological Rough Sets

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Specialization: Mathematics

Interest area: Numerical Analysis

15

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Academic rank: Assistant professor.

Specialization: Mathematics

Interest area: Set Theory, General Topology, Fuzzy Topology, Fuzzy Algebra, Applications of Topology

16

Name:. Nazmi, Kamal Nimer
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Academic rank: Lecturer.

Specialization: Mathematics

Interest area: Pure Mathematics

17

Name: Mahgoub,Mohammed Omer
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Academic rank: Lecturer

Specialization:Applied Mathematics

Interest area: optimal control

18

Name: ALMUQRIN, Muqrin

Academic rank: Lecture

Specialization: Mathematics

Interest area:

General Units in the department and its main tasks

THE COMMITTEE OVERSEEING THE PROGRAM

1- Supervising the implementation of the action plan program.

2- Choosing a counsel to assist in the rehabilitation Department for accreditation by the accreditation; and in coordination with the committee on the development and quality assurance.

3- Completing all of the requirements of accreditation in the national body standards department (NCAAA).

4- following-up and coordination with the Committee on the development and quality in faculty and reporting and prepare a Visual presentation of the department and the department and guide the program.

QUALITY AND ACCREDITATION COMMITTEE

1- Supervising and collecting of (program description – report – description of courses – report of decisions).

2- Overseeing follow-up self-study preparation (SSR) for the department.

3- Supervision of the preparation room within the department for academic evaluation and accreditation and program documentation is complete and also to visit residents during periods of the calendar program.

4- Reporting periodically on how complete the requirements of accreditation.

5-Supervising the preparation of exams students and models to answer for decisions and providing ways of teaching and learning for students in coordination with the committees department.

6-development, management and quality control processes in the Department.

7- Following-up to and choosing the standard reference for the department.

8- Supervision and follow-up of development plans and future planning.

9- Following the modern trends in methods and methodology and teaching techniques.

10- Identifying training programs department for the development of teaching skills, research and art.

11- Preparing and distributing and collecting of the student questionnaires on the usefulness of the training program during the years of study and the appropriateness

of the decisions for life process and proposals to expand the utilization and preparation of statistical results tab.

ACADEMIC ADVISING COMMITTEE

1- Raising awareness of the importance of accreditation for the department through meetings.

2- Expanding the concept of academic advising and academic advisor role in guiding the student to plan for their future education.

3- Preparing of questionnaires for academic accreditation in relation to academic guidance, distribution, collection, analysis and presentation of results Recommendation program accordingly.

4- Deepening trust between students and faculty.

5- Receive and respond to suggestions or complaints from students.

6- Educate students with support services.

SAFETY AND SECURITY COMMITTEE

1- Ensuring all laboratory equipment and student services.

2- Checking the availability of maintenance plans of plants, equipment and student services.

3- Reporting periodically to the Chief of department at the end of each academic year for repairs/adjustments.

4- Overseeing security and safety procedures in the laboratory and classroom before school and provide

Report to the Department Chair.

5- Awareness-raising and the preparation and distribution of publications to students and safety of various risks (chemical-electrical-radioactive) at the beginning of the school year.

And-signs and safety procedures in a prominent place in every classroom and laboratory and emergency telephone numbers,

FOLLOW-UP OF ALUMNI AND COMMUNITY PARTNERSHIP

1- Personal data collection and the disaggregation of student department and their means of communication.

2- Data collection and the disaggregation of data on employers and their means of communication.

3- A program to document relevant to graduates employment destinations.

4- Propagating and distribution and collection of questionnaires on satisfaction this category on their course; and preparation of statistical results and recommend accordingly.

5- Creating of effective mechanism for the provision of employment opportunities for graduates in their respective fields (for example, by convening meetings of employment – employers ' views on levels of graduates-exploring the views of employers in the important decisions of the program and the department).

6- Activation of communication graduates (such as the alumni department).

7- Surveying of graduates who joined jobs on their assessment of the usefulness of the program and contents of previous decisions.

THE TRAINING COMMITTEE AND COMMUNITY SERVICE

1- Collecting and compilation project carried out by the Department and its members and their contributions in community services and development plans.

2- Promoting and entrepreneurship students to maximize returns on the role service to the community through then Tools and publications, in coordination with the committees department.

3- Deepening communication between the Faculty and those responsible for developing plans in Saudi Arabia.

4- Developing programs to strengthen the relationship between the Department and the community and follow up their implementation.

THE COMMISSION ON GRADUATE STUDIES AND SCIENTIFIC RESEARCH

1- Developing a system for monitoring and documenting and disseminating scientific research data and participate in conferences.

2 – Creating and update a database of research projects and published by the department faculty.

3 – Encourage scientific publishing in scientific journals of the world rankings.

4 - Announcement Listing research for faculty members on the website of the department and updated annually. And - do the tasks referred to it by the Committee on Graduate Studies and Research at the faculty.

5 - Recording current research projects and ending the department and implement the Declaration of names on the website of the revenue department and the community.

6 – Making yearly calendar for scientific research projects department and lifting the recommendations of the Committee on Graduate Studies and Research faculty.

COMMITTEE SCHEDULES

1- Work schedules quarterly department.

2- Distribution of the burden of teaching on the Faculty department.

3- Distribution decisions in agreement with the decisions of the scientific committees in the department.

4- Coordination with other faculties on the mathematics courses.

STUDY PLANS

1 – Action guide includes decisions and objectives and help on using the latest scientific methods in the teaching process and continuous.

2- Fined a link either directly by departments or through community service with public education and the labor market.

3 – Audit report of the external auditors to study the development of the department and to develop action plans to remedy the deficiencies.

ADVERTISING AND PUBLISHING COMMITTEE

1- Preparation, implementation and supervision of the department University website page on the Web.

2- Prepares and prints student guide and academic publications and training packages.

3- Coordination with faculty members to publish their scientific department.

THE COMMITTEE ON TESTING AND CONTROL

1- Coordination with the Committee Chairperson for scheduling tests.

2 – Holding training workshops on emerging quality control tests.

3- Picking up and delivery of tests and to faculty members

4 – Saving your answers students for analysis and review.

THE STUDENT ACTIVITIES COMMITTEE

1- Preparing and organization of sports and cultural activities for students department

2- Organizing periodic meetings with the Dean and Department Chair

3- Field visits Academy.

THE EDUCATION COMMITTEE

1- Activating media e-learning campus

2- Training sessions for faculty to take advantage of e-learning.

COMMITTEE SUGGESTIONS AND COMPLAINTS

1 – Suggestions and complaints about the department of all relevant actors.

2- Lift Department Council of ideas and suggestions.

Facilities and Resources

The number of classes required for department:							
Total number:	9			**The number required is:**	3		
-The number of laboratories and workshops for the Department:							
Total number:	3	Total cost:	R. s.	**The number required is:**	2	**Current cost:**	R. s.
-The number of faculty members, lecturers and teaching assistants are required:							
Total number:	24			**The number required is:**	12		
-Number of offices for Administration and services, meetings and conferences:							
Administration offices:	2	**Student services:**	----	**Conferences**	----	**Meetings**	1
Management offices and the services required:							
Office of the Head of the Department, (1) Associate (1) Secretary (1), library (1)							
Tools for teaching and learning							
Classic instruments:							
Classrooms-reference books the process – computer lab - Monitors							
Audio tools:							
Non							
Visual Tools:							
Non							
Electronic tools and programs:							
Smart boards-Internet-software-Like maple -mat lab							

STUDENT GUIDANCE

The first Article: Definitions

Academic year: Two main semesters and a summer semester if need be.

The semester:

A period of time not less than fifteen weeks, during which courses are taught. The period for registration and final examinations are not counted within this period.

Some courses may have prerequisite(s) or co-requisite(s).

The Summer Semester:

A period of time not more than eight weeks. The period for registration and final examinations are not counted within this period. Each course is taught extensively within this period.

Academic Level

It indicates at what stage a student studies. Graduation requires studying eight levels or more according to credit hours plans.

Course:

An educational material related to a specific level within the credit hours plan for each programmed. Each course has a number , code ,name and specification that distinguishes it from other courses. Each course has also a special file that a department keeps for the purposes of follow up, assessment and development.

Credit Hour:

A weekly theoretical session not less than fifty minutes, a clinical session not less than fifty minutes, or a practical/ field work not less than hundred minutes.

Academic Warning:

Notification made to a student because of his /her low grade point average, from the minimum shown in this by-law.

Class Work Score:

A score given to a student showing his/her achievements on the continuous assessment from tests, research and other academic activities related to the course.

Final Examination

A final examination administered once at the end of a semester.

Final Examination Score

The score that a student achieves in each course in the final tests of the semester.

The Final Score

The sum total of class work scores and final examination score for each course. The score is computed out of hundred.

The Grade

Description of the percentage or an alphabetical code for the final score a student achieves in each course.

Incomplete Grade

A grade entered provisionally for each course a student is unable to fulfill its requirement in the specific time. It is referred to in the academic record with the abbreviation (IC) **.**

Continuous Grade

A grade entered provisionally for each course which nature of study requires more than one semester for completion. It is referred to with the abbreviation (IP).

Semester Grade Point Average

Sum total of the points a student achieves divided by the total credit hours for all the courses studied in every semester. Points are computed by multiplying the credit hours of a course by the grades a student achieves for each course.

Cumulative Grade Point Average

Sum total of the points a student achieves in all the courses he/she studies since his enrolment in the university, divided by the total credit hours for all those courses. Refer to Appendix (B).

The General Grade

Description of the level of a student's academic achievement during the period of his study in the university.

The Minimum Academic Load

The minimum credit hours a student should register for, compatible with his Grade Points Average, as decided by the university Council.

Level system

* School system divides the academic year into two semesters, there may be a summer semester that is a half-term presence.

Absence

* A student attending lectures and practical lessons, and denied entry into the final test if increased absenteeism (25%) Lectures and practical classes for each course during the semester the student is denied access to the test because of absence he has in the course and made him appreciate deprived (ح) or (DN).

* Medical reports within the selected absence rate 25% except hypnosis hospitals or security custody only.

* The student who is absent from the final exam will have degree zero on that test, and calculates his appreciation of that decision on the basis of quarterly business degrees obtained.

* If the student is unable to attend the final examination in any of the articles of the chapter for compelling excuse Faculty Board may, in extreme cases accept the excuse, allowing him an alternative test which is held within a period not exceeding the following semester and gives the estimate after performing the test.

Deferral and Leaving Study

Article XIV:

The student may apply for deferral of study for reasons acceptable to the University Council. Duration of deferral should not exceed two consecutive semesters, or maximally, three non-consecutive semesters throughout his study in the university. After that his registration shall be cancelled .The University Council may make exceptions if necessary. The period of deferral shall not be counted as part of the required period for completing the requirements of graduation.

The Operational Rule for Majmaah University:

The student may apply for deferral of study before the end of the first week for an acceptable reason to the dean of his faculty or whoever he delegates, provided that the duration of deferral shall not exceed two consecutive semesters, or three non-consecutive semesters. The students in the faculties that adopt the annual system may not defer for two consecutive years. Maximally, the period of deferral should also not exceed two non-consecutive years during his study in the university, after that his registration shall be cancelled. If necessary, the University Council may consider some. Exceptional cases.

The period of deferral shall not be counted within the specified period for completing the requirements of the study.

Female student who escorts her husband or her legal escort may defer her academic situation (admission or registration) for a period not exceeding five years. If a female student wishes to resume her study, she is allowed to, taking into account the following:

If the syllabi is changed, the similar courses that the student had already studied shall be equated and the requirements of graduation to be completed in accordance with the new syllabus.

If the syllabi are not changed, the student resumes from her previous academic situation.

After five years, the chance of the female student may be preserved in the department for her to begin as a new comer.

The deferred student must register after the end of the deferral period otherwise he considered as leaving study.

The Dead ship of Admission and Registration shall require for the approval of the female student's guardian when she applies for the deferral of the semester.

Article XV

If the regular student leaves study for one semester without deferral, his registration in the university shall be cancelled. The University Council may cancel the registration of the student if he left study for less than that period. As for the external student, his registration will be cancelled if he absents himself from all the final examinations of the semester without an acceptable excuse.

The Operational Rule for Majmaah University:

The registration of "the student leaving study because of non-registration" will be cancelled if he does not address his academic situation before the end of the week from the beginning of the semester.

Article XVI

The student shall not be considered as leaving study for the semesters s/he studies as a visiting student in another university

The Operational Rule for Majmaah University:

See Article Fifty and its Operational Rule related to the visiting student

Attendance and Withdrawal

Article IX

The regular student must attend the lectures. He shall be debarred from the final examination if the percentage of his attendance is less than the percentage fixed by the University Council, provided it is not less than (75%) of the lectures for each course during the semester. The student who is debarred, because of absence, is considered as a failure in the course, and will be awarded the denial grade (DN).

The Operational Rule for Majmaah University:

The student shall be debarred from the final examination if the percentage of his absence exceeds (25%) out of the total lectures of the course without an acceptable excuse.

The student who is debarred from the examination because of absence is considered as a failure in the course. He will be awarded the score of the course work and given the denial grade (DN).

The lists of the debarred students shall be approved by the concerned Faculty Board.

The lists of the debarred students shall be announced before the beginning of the final examinations.

Article X

The Faculty Board or whoever it delegates may, exceptionally, forward the debarred students lists and allow the students for entering the examination, provided he will give an acceptable excuse to the board. The University Council will determine the percentage of absence, provided it shall not be less than (50%) of the lectures for the course.

Article XI

The grade of the student who absents himself from the final examination shall be zero in that exam. His grade in that course shall be counted according to the scores of the course work he obtains.

Article XII

If the student is not able to attend the final examination in any course of the semester, for a compulsive excuse, the Faculty Board, in very urgent cases, may accept his excuse and give him the permission for a substitute examination to be conducted within a period not exceeding the end of the following semester. He shall be given the grade he obtains after sitting for the substitute exam.

The Operational Rule for Majmaah University:

The excuse for absence from the final examination shall be accepted in the following cases:

The cause of the excuse should be timely given until a week after the cause is over.

The compulsive excuses accepted by the Faculty Board.

The substitute examination and entering of the grade shall be within a period not exceeding the end of the following semester.

Article XIII

The student may withdraw from the semester without being considered as failure if he provides an acceptable excuse to the authority specified by the University Council, within a period of time specified by the operational rules, approved by the University Council. The grade (W) shall be given to the student. This semester will be counted as part of the time required to complete the requirements of graduation.

The student may withdraw from one course or more in a semester with an excuse, according to the operational rules approved by the University Council.

THE OPERATIONAL RULE FOR MAJMAAH UNIVERSITY

(13-1) a student may withdraw from studying a semester without being considered a failure, if he forwards an application to that effect to the dean of his faculty, at least three weeks before the beginning of the final examinations in accordance with the university schedule. The students of the faculties that adopt the annual system may withdraw before at least five weeks from the beginning of the final examinations. The students of the short courses may withdraw before the beginning of the examinations, equivalent to one third of the duration of the course. The university Rector may exceptionally, consider some , very urgent cases if necessary, from these durations, in which cases the student is given the withdrawal grade(W) and this period is counted as part of the of the time for completing the requirements of graduation.

(13-2) Withdrawal chances shall not exceed two consecutive or three non-consecutive semesters. As for the students of the faculties that adopt the annual system, they may not withdraw for two consecutive years. Years of withdrawal should not exceed two non-consecutive academic years throughout the student's stay in the university, after which period, the student's registration is cancelled. The dean of Admission and Registration may consider some exceptional cases.

(13-3) Dean of Admission and Registration may ask for the acceptance of the guardian of the female-student when she applies for withdrawal from a semester.

(13-4)A student may withdraw from one course or more per a semester and no more than three courses throughout the period of his study in the university in accordance with the period specified in the rules, according to the following conditions:

Approval of the dean of the faculty.

Applying for withdrawal from the course before the deadline for withdrawal from the semester.

The abbreviation (W) is entered for the course a student withdraws from

DISMISSAL FROM THE UNIVERSITY

The student shall be dismissed from the university in the following cases:

a. Maximally, if he has got three consecutive probations, because of his decreasing CGPA to less than the fixed rate for graduation in accordance with the Article (19) of this by-law. According to a recommendation from the faculty board, the University Council may give a fourth chance for those who can raise their CGPAs by studying the available courses.

b. If he does not complete the requirements of graduation maximally within half the period for his graduation in addition to the duration of the program. The University Council may give an exceptional chance for the student to complete the requirements of graduation within a period that should not exceed double the period fixed for graduation.

c. The University Council may, in exceptional instances, treat the cases of the students to whom the provisions of the preceding two paragraphs apply, by giving them an exceptional chance that does not exceed two semesters, maximally.

The Operational Rule for Majmaah University

1. The student shall be given probation if his CGPA decreases from 2.00 out of 5.00. That will be evident in his academic record.
2. If the student gets three consecutive probations, he will be deemed academically dismissed. His case shall be treated as follows:

a. The University Council may give the student a fourth chance in accordance with a recommendation of the Faculty Board for those who can raise their CGPAs by studying the available courses.

b. The Standing Committee for Students' Academic Problems may recommend to the university Council to give the student a fifth chance according to the recommendation of the Faculty Board, provided there is an improvement in his performance in the last semester, his CGPA being not less than 2.00 out of 5.00 and he can raise his it by studying the available courses.

c. The University Council may exceptionally give the student a sixth last chance after the recommendation of the Standing Committee for the Students' Academic Problems.

3. For the faculties that adopt the annual system , the student is deemed academically dismissed if his CGPA decreased to less than (2.00) for two consecutive years, until the Faculty Board takes a decision on it as follows:

a. The Faculty Board may recommend to the University Board to give the student a first chance. If the student fails to raise his GPA, afterwards, the Faculty Board recommends about him to the Standing Committee for Students' Academic Problems.

b. The Standing Committee for Students' Academic Problems may recommend to the University Council to give the student a second chance based on the recommendation of the Faculty Board. If the student fails to raise his CGPA afterwards, the committee may recommend about him, if necessary, to the University Council.

c. The University Council may, exceptionally, give the student a last third chance after the recommendation of the Standing Committee for the Students' Affairs.

4. If the student does not complete the requirements of graduation within the limited period for graduation, his case will be addressed as follows:

a. If he does not complete the requirements of graduation maximally within half the period for his graduation added to the period of the program, the Faculty Board may give the student an exceptional chance to complete the requirements of graduation within a maximal period not exceeding twice the fixed original period for graduation, provided the cause of delay is e acceptable to the Faculty Board.

b. The University Council may give the dismissed students who have exhausted twice the period of the program, a chance not exceeding two semesters, recommended by the Standing Committee for the Students' Academic Affairs.

5. The Faculty Board makes an inventory of all the cases it receives and presents them to the relevant councils and informs the Deanship of Admission and Registration within a period of time not exceeding the first two weeks from the commencement of the semester. In case of delay, the student shall not be permitted to register except for the following semester.

TESTS

Article XXII

The concerned Faculty Board determines the midterm score according to the recommendation of the department board. It should not be less than 30% of the final score of the course.

The Operational Rule for Majmaah University:

1. The concerned faculty board responsible for the course determines the midterm score according to the recommendation of the concerned department in the range between (40%) and (60%) of the final score.
2. According to the recommendation of the department board ,the faculty board shall make decisions as regards the following:

a. Amendment of the results
b. Determining substitute exams

Article XXIII

The Midterm score is counted in one of the following ways

1. Oral tests or practical tests, research, classroom activities, some or all of them, including at least one written test.
2. Two written tests at least.

Article XXIV

According to the recommendation of the department board, the concerned faculty board responsible of the course may include the final examination in any course, written or oral. It may also determine the specified scores out of the final exam.

Article XXV

According to the recommendation of a course instructor, the department board assuming the responsibility of teaching a course may allow the student to complete requirements of any course in the following semester. The abbreviation (IC) is used to indicate to this. It will neither be included in the calculating Grade Point Average nor Cumulative Grade Point Average, until the student completes the requirements of that course. If a semester lapses without the student changing the (IC) in his academic record, it will be substituted for (F) and counted within his or her (GPA) and (CGPA).

Article XXVI

All or some of research, debate, science oriented or field work courses may be treated exceptionally from the provisions of articles (22, 23,24) by decision from the faculty board. The faculty board shall determine assessment of a student's achievement in these courses.

The Operational Rule for Majmaah University:

All or some of research, debate, science oriented or field work courses which include the clinical courses may be treated exceptionally from the provisions of articles (22,23,24) by a decision from the faculty board according to the recommendation of the department board responsible for teaching the courses. The Faculty Board determines the evaluation of the student's achievement in these courses.

Article XXVII

If research courses require more than one semester the grade (IP) shall be used. After completion of the course, the student is will be given the grade s/he obtains. If the course is not completed in the fixed time, the concerned department board may my approve entering the grade (IC) in the student's record.

The Operational Rule for Majmaah University:

The fixed time for completing a course which grade is (IP) is one semester following the semester in which the student has obtained the grade (IP)

Article XXIX

Taking into account requirements of Article (19) of this By-law, when the student graduates, his general grade for Cumulative Average will be as follows:

1. (Distinction) if the CGPA is not less than 4.000-5.00, or 3.00 out of 4.00
2. (Very Good) if the CGPA is from 3.75-to less than 4.50 out of 5.00 or 2.75 to less than 3.50 out of 4.00.
3. (Good) if the CGPA is from2.75 to less than3.75 out of five or 1.75 to less than2.75 out of 4.00.
4. (Pass) if the CGPA is from 2.00 to less than2.75 out of 5.00 or rom1.00 to less than 1.75 out of 4.00.

The Operational Rule for Majmaah University:

The general grade for the GPA when the student graduates are based on his CGPA according to the grade weight. Out of (5.00) points.

Article XXX

Honors Degree is awarded to the student who obtains CGPA (4.75) to (5.00) out of (5.00) or (3.75) to (4.00) out of (4.00) in graduation. The Second Class Honors is awarded to the student who obtains the CGPA (4.25) to less than (4.75) out of (5.00) or from (3.25) to less than (3.75) out of (4.00) in graduation**.**

The following conditions are required for obtaining the first Class or the Second Class Honors Degree:

1. The student should not have failed in any course during his studies in the university or any other university.
2. The student should have completed the requirements of graduation within a period not more the average between the maximum and the minimum period for staying in his faculty.
3. The student should have studied at least 60% of graduation requirements in the university from which he obtains the degree.

The Operational Rule for Majmaah University:

Honors Degree is awarded to the student who obtains CGPA (4.75) to (5.00) out of (5.00) or (3.75) to (4.00) out of (4.00) in graduation. The Second Class Honors is awarded to the student who obtains the CGPA (4.25) to less than (4.75) out of (5.00) or from (3.25) to less than (3.75) out of (4.00) in graduation**.**

The following conditions are required for obtaining the First Class or the Second Class Honors Degrees:

1. The student should not have failed in any course during his studies in the university or any other university.
2. The student should have completed the requirements of graduation within a period not more the average between the maximum and the minimum period for staying in his faculty.
3. The student should have studied at least 60% of graduation requirements in the university from which he obtains the degree.

Transfer from University to another

Article Forty Two

A student's transfer from another university may be accepted according to the following regulations:

1. The student must have studied at a recognized university.
2. He must not be dismissed from the university he referred from for disciplinary reasons.
3. Terms of transfer, determined by the University Council, must be applicable to him.

The Executive Rule of Majmaah University:

A student's transfer from another university may be accepted according to the following regulations:

1. He should have an academic record with a cumulative average of at least one semester and studied in a faculty or university recognized by the Ministry of Higher Education.
2. He should not have failed in the GPA.
3. He should not have been dismissed from the University for Disciplinary Reasons.
4. Transfer should not be from the lower academic degree to the higher.
5. Conditions of transfer, determined by the Faculty Board, must be applicable to him.
6. Credit hours required from the transferred student to study, must not be less than 60% of the total credit hours for obtaining the BA degree from Majmaah University.

7. The total period spent by the student from the university he transfers from and the remaining period for him in Majmaah University should not be more than the average period between the minimum and the maximum for remaining in the faculty.
8. Procedures of transfer must be completed before the end of the first week from the beginning of the semester, or the beginning of the year for the faculty's that adopt the annual system. If the procedures exceed this period, transfer shall be effective next semester.
9. Transfer must be written on the student's academic record.

Article Forty Three

The Faculty Board equates the courses the student studies in another university, according to a recommendation of the Department Board that provides the courses. The courses equated are written on the student's record. They are not included in the calculation of cumulative GPA.

The Executive Rule of Majmaah University:

The concerned faculty board equates the courses the student passes in another university, according to a recommendation of the Department Board that gives the courses, provided the equated courses should not exceed 40% of the credit hours of the syllabus of the specialization transferred to. The courses equated are written on the student's record. They are not included in the calculation of cumulative GPA, on condition that the content of the course the student passes is equivalent to the course(s) to be equated.

Article Forty Four

If it appears after the student's transfer, that he had previously been dismissed for disciplinary reasons, his registration shall be deemed canceled from the date of acceptance of his transfer to the university.

Article Forty Five

A student may be transferred in any semester, from a university to another, according to the procedures and declared schedules in the university transferred to, in the light of the general guidelines for transfer.

Transfer from Faculty to Another within the University

Article Forty Six

The student may transfer from one faculty to another within the university in accordance with the regulation sap proved by the University Council.

The Executive Rule of Majmaah University

Firstly, transfer of a student from one faculty to another within the university is done according to the following regulations:

1. Acceptance of the students by deanship of the faculty is according to the regulations set by the Faculty Board.
2. A student must not have spent more than four semesters, provided that the preparatory programs such as extensive language courses are not counted within that period.
3. Procedures of transfer should be completed within the first week of the semester or the academic year, for the faculties that adopt the annual system. If the procedures exceed this period, transfer shall be effective the following semester.
4. Transfer shall not be allowed except after a student spends at least one semester in the faculty he wishes to transfer from.
5. A student is allowed to transfer once during his university studies, or twice if one of these is the preparatory year or the intensive course of English.
6. a student transferred to the preparatory year or the intensive course, will be returned to his previous department if he does not pass, only once.
7. Specialization after passing the preparatory programs is not counted within the transfer movements.

Secondly, transfer of a student from the qualifying programs to the corresponding faculty that awards BA programs within the university is according to the following regulations:

1. No student may transfer from BA to one of the qualifying programs.
2. A student is allowed to move to the corresponding faculty, if he finishes all the courses of the qualifying program, with the Grade Point Average 2/5 (two out of five).

3. If a student completes 50% of the total credit hours of the qualifying program, with a Grade Point Average of 4 to 5, or more, he can transfer to the corresponding faculty.

4. If a student completes the qualifying program but six hours remain for him, he may transfer to the corresponding faculty, provided, his Grade Point Average is not less than 2.5 to 5.

Article Forty seven

All the previously studied courses shall be written in the academic record of the student who transfers from a faculty to another. This includes Grade Point Averages, and Cumulative Grade Point Averages, during his study in the university.

Transfer from Specialization to Another

Article Forty Eight

On the approval of the dean, a student may transfer from one specialization to another within the faculty, according to the regulations set by the University Council.

The Executive Rule of Majmaah University

1. A student may transfer from one specialization to another within the faculty after the approval of the dean of the faculty, according to regulations set by the Faculty Board.

2. The remaining period for him in the university should be enough to finish graduation requirements.

3. Transfer procedures should be completed within the first week of the beginning of the semester or year for the faculties that adopt the annual system. If procedures exceed this period, transfer will be effective the following semester.

4. A student is allowed to transfer once during his university study.

Article Forty Nine

All the previously studied courses shall be written in the academic record of the student who transfers from one specialization to another. This includes Grade Point Averages, and Cumulative Grade Point Averages, during his study in the university.

Visitor student

a visiting student is he who studies some courses in another university or a branch of the same university without transferring to it. The courses he studies are equated according to the following regulations:

a. The student has to get the approval of the faculty in which he intends to study as a visiting student prior to admission.
b. The faculty or the university in which he intends to study should be a recognized institution.
c. The courses to be studied in another university should be equivalent to the requirements of graduation in his university.
d. If the visiting student studies in one of the branches of the faculty he studies in, he will be treated in accordance with Article (47).
e. The University Council determines the maximum percentage of credit hours to be considered for the external student.
f. The courses equated for the visiting student are not counted within his CGPA. The courses are written on his academic record.
g. Any other conditions set by the University Council.

The Operational Rule for Majmaah University

A visiting student is the student who studies some courses in another university or a branch of the same university without transferring to it. The courses he studies are equated according to the following regulations:

Firstly, any student from Majmaah University who wants to study as a visiting student:

1. Bring a prior permission from his faculty allowing him to study as a visiting student, determining the courses he would like to study. The faculty may condition that the student should attain a specific rate for the course equation. He will be given a letter from the Deanship of Admission and Registration to that effect.
2. The student should have an academic record with a (CGPA) for at least one semester in the university, before he applies as a visiting student.

3. The university or the faculty in which he intends to study should be a recognized institution.
4. The course the student intends to study in another university should be equivalent to one of the courses included as part graduation requirements.
5. Taking into account (Article 42), the maximum total for the credit hours to be counted for a visiting student is 20% from the total graduation credit hours in Majmaah University.
6. Equated courses of the visiting student shall not be counted as part of the student's (CGPA). The courses shall, however, be registered in his academic record.
7. The student should inform the Deanship of Admissions and Registration the results he obtains within the first week from the beginning of the semester following his study as a visiting student. If he does not provide his results, he shall be considered absent (except summer courses) and he shall be treated in accordance with (the Article 15).
8. A visiting student shall be paid a monthly bonus if he deserves it through manual files after forwarding his results of the semester to the Deanship of Admission and Registration.
9. The maximum numbers of the semester's students are allowed to study as visitors are two semesters.

Secondly, any student from another university who wants to study in Majmaah University should:

1. Have an academic record with a (CGPA) of one semester at least from the university in which he had been admitted.
2. He should obtain a prior written approval from his university, permitting him to study as a visiting student in Majmaah University. In the letter he should mention the courses of Majmaah University he would like to study.
3. He should get the approval of the faculty in which he wishes to study as a visiting student.
4. The visiting student from another university would not be awarded a bonus from Majmaah University.

5. The courses the student takes are registered by the Deanship of Admission and Registration, taking into account all the regulation of registration.

Reward students

Is a monthly stipend to students the value of SR 990 in accordance with the following controls:-

1. Low rate student 2

2. Low teaching hours during the semester for 12 hours

The deanship of admission and registration is responsible for follow-up to the remuneration.

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