Ministry of higher education
Majmaah university
College of Science
Department of Mathematics

وزارة التعليم العالي
جامعة المجمعة
كلية العلوم
قسم الرياضيات

Study Plan

Mathematics Program

2014

Contents

بسم الله الرحمن الرحيم

Introduction:

The introduction of a new academic program or amendment to the academic program is an ongoing process vehicle contains a lot of influential elements that must be taken into account.

Perhaps the most important of these elements are added scientific value and quality that can be added by this program to the community, labor and the environment that surrounds it. Since the interaction program outputs of staff with high professional and scientific expertise with a mature ,shows us the importance of this and the importance of refined it, and put it among the priorities of the program to be introduced.

When the affecting elements are available as plan study which is well-studied and the corresponding national standards, global availability of teaching staff qualification with necessary specializations , the study of the labor market, the provision of educational resources and learning different ,all these contributes a significant contribution in building the academic program has the ability to achieve the desired objectives.

Like any academic program aspires to improve and see its reflection on the educational process ,must be put a clear strategy for self-assessment through quality standards for all elements of the program of teaching , tests , plan of study , characterization of the courses and management education to the other, as a total evaluation and continuously aims to use the feedback to the development and improvement .

It must be based on the program that they have a clear vision and strategy for future development, a series dealing with variables , events and interact with them ,in order to change and amendment of construction to serve the axis of the academic process and improves output

The request for the creation or modification academic program , which is available in your hands now aims to organize and inventory data should provide for the development of the academic program and the completion of its elements. Where he was working on the request to divide the ten main parts :

Part I: definition of the academic program

Part II : the importance of the program

Part III : Relationship of the program with other programs within the department and faculty

Part IV : The syllabus of the program

Part V : characterization of the program and description of courses

Part VI : Hardware implementation of the program

Part VII : tools and sources of teaching and learning

Part VIII : Strategic Plan for the Future program

Part IX : quality requirements

Part X : Approval of the program

Majmaah University

Vice President for Educational Affairs

The Standing Committee of the plans and the studing system

Excellency:----------

Topic: request to amend the academic program

Enclose your request **to amend** the academic program in accordance with the following basic information:

Program Name: Study Plan for the Bachelor of Science Degree - specialization (mathematics)

Program code: ---------- (MATH) ----------
Department Name: ---------- (Mathematics) ----------
College: ---------- (College of Science, Zulfi) ---------- -----
Region: ---------- (Riyadh) ---------- government: --------- , (Zulfi) - ------

……

Applicant Information

Applicant Name: dr. Mohammed Saleh Aboudy Academic department: Mathematics

Degree Academic : Doctorate Professional rank: Assistant Professor

Administrative Classification: Dean of the College Mobile: 0504892443

E-mail: al-aboodi@hotmail.com

Note that the information contained in the application have been discussed in the department council session No. (10) dated 06/12/1434 AH and was recommended by the College Council to amend the academic program, which in turn passed the approval of the (modified) department in its meeting No. (22) on 19 / 6/4143 and its attachments is true and sound and it sign.

Signature of Applicant:

Well .. do not fill in the information below
The present application for: ---------- ----------
Ranked administrative: ---------- ---
Dated: / / 143, corresponding to: / / 201 Recipient name : ----------
signature: ----------

Guide pilot

Introducation

The development of an application or amend an academic program is a rigorous process requires the mobilization of multiple information and correct. So we hope that Your Excellency read carefully the terms of the form and fill out the information accurately. We also hope dimension for verbosity unjustified and crowbar abbreviation for information.

So before starting to fill out the form we hope to collect the necessary information that will help you complete this application with ease and accuracy, including

1 - information relating to the program's objectives, vision and plans for the future
2 - software components and infrastructure
3 - teaching staff and administrative
4 - Study Plan and components
5 - Study the feasibility of developing the program or modify it (the justification for the construction and its impact on society and economic areas of the department's graduates)

Terms of submission of the application:

1 - Fill out the information in the attached forms complete. In the case of not being able to fill in certain information be contacted by the Vice President for Educational Affairs - management programs and study plans (T / 064 041 055, P / 064 041 066) to ask for help.
2 - attach all the documents and data required to be submitted with the application.

3 - Information to be included precise and clear.
4 - is fill out the application electronically and then printed and signed and delivered by hand according to the instructions attached

Attachments:

1 - Model program specification (Model A)
2 - Model approve of the study plans and programs
3 - Sample study plan for the program (model b)(the requirements of the University ,College and department)
4 – Summary of model characterization of the courses for the study plan (Form C)
5 – Model of characterization of the courses of the study plan (Form D)
6 - Model kits infrastructure of academic program (Form H)
7 - Model needs of academic staff , technical and administrative (model y)
8 - The recommendation of the the department and approval of the College to approve on the creation (modified program) {image of the minutes of the meetings}

Note: The information in the attachments are provided with the application and processing of first supposed to help you fill out an application development of the program

Fill out mechanism of the application:
1 - fill out the application electronically
2 - application printing on one side clearly
3 - submit three copies of the application and one copy of attachments
4 - attach the attachments in the last request and referred to during the mobilization of the application in the box reserved

5 - If there are other attachments are attached and are also referred to dissuade fill out the application in the box reserved

Note: If you do not fill out the application in accordance with the completion of the conditions will be back again and receive a new application.

At the beginning and before we prepare a model we would like to give a brief about the college

About the College

Issued royal approval precious establishment of the college of Science in Zulfi City on 5 /8/1426 ah to be another brick in the edifice of higher education and a part of the system of University City in Qassim , has begun to study at the college of Science in the academic year 1427/1428 AH, the college has four departments namely the department of mathematics , department of Computer and Information Sciences,the department of physics and department of Medical Laboratories in addition to the preparatory year for those departments .when has been issued royal approved precious for building University collected on 03/09/1430 .The college of Science in Zulfi city was one of the colleges mentioned in the decission of the University of bundled , a basic science of Dentistry college is teaching at the college of science

A new students in the college of Science in the preparatory year program for a period of one academic year, and this year is a preparatory stage for students wishing to specialize in the various departments of the college and is calculated with the average GPA of the student. Designed to prepare students to receive academic education in spades and English language skills and train students on the skills of thinking and learning. The college offers the following degrees:

1 - Bachelor of Science degree in Mathematics

2 - Bachelor of Science Degree in Physics

3 - Bachelor of Science degree in Computer Science

4 - Bachelor of Science degree in medical laboratory

Vision College

1 - scientific leadership and research in the disciplines of the college and community service and rehabilitation of students commensurate with the professional requirements of modern science.

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

3 - to achieve leadership and excellence in building a knowledge society , educational humanities , applied through academic programs and scientific different departments which enable it to be a reference, and provide comprehensive professional consultancy of Saudi society in accordance with the standards of quality and academic accreditation recognized locally and globally

Mission of the college

Autocratic character of distinguished scientific through study plans meet the requirements of the accreditation of academic standards and the labor market to provide an academic environment conducive , learning and research faculty members ,and provide knowledge services to the community.

Focus on creativity, self-development and production of innovative research serves higher education by providing a learning environment, and take educational quality standards applied in international universities

Goles of the College

1 - To provide an outstanding education in an integrated learning environment to contribute in the preparation and training of human resources to qualify academically , culturally and professionally carry out their tasks in the various disciplines of the college to serve the community.

2 - development of scientific research , authoring and translation in the various disciplines of the college.
3 - building a genuine partnership with the community.
4 - continuous improvement of the organization of academic and administrative faculty.
5 - sophistication of student activities and training to acquire the necessary knowledge and skills.

Admission Procedures in the college

In order to accept new student at the university the following: -
1 - Be holds a high school diploma or its equivalent from within or from outside the KSA
2 - Should not have been on the receiving a high school its equivalent for more than five years, may be the exception to the University Council if there is compelling reasons.
3 - to be of good behavior
4 - to successfully pass any test or an interview seen by the University Council.
5 - to be medically fit
6 - to get approval from the study attributed if it works in any government or private.
7 - to satisfy any other conditions determined by the university at the time of submission.
8 - not to be dismissed from another university for disciplinary reasons or educational, and if it turns out after accepting his dismissal shall be deemed to have been previously canceled from the date of acceptance of acceptance.
9 - may be admitted student dismissed from the university for educational reasons in some programs that do not grant bachelor's degree, according to the decision of the University Council or his representative, and may not be in the transitional program
10 - It is not permitted to accept those with a bachelor's degree or

its equivalent for the last Bachelor, and manager of the University of exception that

11 - It is not permitted to accept a student registered for a university degree and the other without, both in the same university or the other.

About the Department of Mathematics

Department was founded in 1427 coincided with the establishment of the college ,it has developed rapidly over the past few years with increasing of faculty members , also with the increasing number of students in the department. The department teaches math courses for the students of the department of Mathematics and all students of other departments in the college and other colleges of the university

Requirements for admission to the program: -

1 - The student must have fulfilled all the requirements to attend with the college

2 - the wishes of the student.

3 – The grade point averge for the student in the preparatory year.

4 - General capasity of the Department

Requirements for obtaining a bachelor's degree

Faculty of Science student spends four years spread over eight semesters and the student must successfully pass **(137) credit hours** for a bachelor's degree , distributed as follows :

1 - |The completion of the mandatory requirements of the university successfully **(12 credit hours) .**

2 - The completion of the mandatory requirements of the college successfully **(29 credit hours .**

3 - The completion of the mandatory requirements of the

department (compulsory + Optional) successfully **(94 credit hours)** .

4 - completed a free course successfully (2 credit hours) .

5 - the completion of field training in one of the government or private .

6 - the completion of all required courses with grade point averge for at least (2.0) .

Code indication of mathematics courses

(0) calculus and statistics
(1) Applied mathematics
(2) Differential equations
(3) Basics and mathematical logic
(4) Algebra
(5) Namurical analysis and programming
(7) Gemotery and topology
(8) Analysis
(9) Project

Model modified academic program

First: the definition of the program (Model B)					
1- The name of the proposed program and symbol and number		MATH	2- College Name	College of Science	
3- Qualification granted by the program(degree)		Bachelor	4- Total cridate hours		137
5- Region	Riyadh	6-government	7-City	Zulfi	
8—Start date program (Creator or average):		Date 24-8-1433			
Fill out the information in item 9 and 10 for the cointinuous and modfied program					
1- If the programis continuous, what is the length of time that has been in use modified program?		Four years			
10 - What is the institution that has assessed the ongoing program and recommended amendments?		College of Science in Zulfi- Mathematics Departments			
11- What is the name and classification of the person responsible for the program?		Dr.Mhammed Saleh El-abodi Dean of College osf Science in Zulfi			

Second: the importance of the program

1-The objective of the program amendment

1- in order to compatible with preparatory year

2 - keep up with developments in the corresponding programs

3 - delete duplicate some courses

4 - Add some modern courses in accordance with the progress in the field of mathematics

5 - to revise and update some courses

2-Vision the program

The mathematics department looks to be a leader at the local, regional and international levels in the areas of education and research by contributing to study the problems and conduct scientific research, And find appropriate solutions to be linked to the research community, while preserving the environment.

3 - Program mission

The provision of educational and research service for the distinct phases of bachelor's and master's degree in mathematics allowing them the opportunity to education capable to compete in the era of globalization to meet the needs of the community while maintaining Islamic values.

4-Program goals

The aim of the mathematics department under the overall goals of the College of Science and objectives of the mathematics department to the following

1 - Preparation of qualified staff to contribute to the service of development and the comprehensive development witnessed by the Kingdom in all fields of life.

2 - positions of specialization in any place of public and private sectors.

3 - promoting scientific research in the field of mathematics, statistics and conduct scientific research to find appropriate solutions and participate in national and international conferences.

4 – working in information technology and data analysis to contribute in the preparation of strategic plans.

1-Justification Modification Program

1- For compatibility with the preparatory year which is approved by the university on the students

2 -Modiving courses in terms of hours and elective courses

3 - Do not keep up with some of the old program of courses for those in the corresponding programs

4 - there are some duplicate courses

5 - Rehabilitation Program for Academic Accreditation

2-The expected needed of the labor market for graduates of this department

√□ Urgent task □ important □ Good □ Normal

3-Output is expected gain its graduates after completion this program

1- Qualified staff to contribute to the service of development and the comprehensive development witnessed by the Kingdom in various spheres of life .

2- positions specialization in any place of public and private sectors .

3- promoting scientific research in the field of mathematics and the study of mathematical and statistical problems and conduct scientific research to find appropriate solutions and participation in national and international conferences

4- abreast of the developments that occur in the field of Mathematics and Statistics

5 - Contributing to find constructive solutions to the issues related to the field of mathematics in science difference

4-The expected learning outcomes of the program

A - Knowledge:

1 - The student learns the deductive nature of mathematics , and the role of definitions, axioms and theorems to form an effective discusion

2 - The student learns the theories and applications of other mathematics fields .

3 - The student learns to numerical mathematics and the different methods in which they are used numerical information .

4 - The student learns the algebraic relations and their role in solving the problems expressed in the form of a symbolic and in the development of mathematical theories .

5 - The student determines the technical and mathematical methods that deal with differential equations and their applications .

6 - The Ivkraltalib engineering concepts and methods of measurement recipes stuff.

7 - The student determines the methods of calculation and capacity of multiple pure mathematics to solve a specific problem numerically without resorting to direct count

B- Cognitive skills :

1 - The ability to put ideas and mathematical methods in the form of equations using the vocabulary and the appropriate mathematical symbols .

2 - The ability to encode problems in the mathematical form and put it in the model . Development and use the models for the evaluation and decision-making .

3 - Ability to view , summarize and analyze problems .

4 - The ability to develop the relationship between the different branches of mathematics and other sciences .

5 - Ability to use appropriate means to study applied mathematics .

6 - To judge the accuracy of the mathematical methods and the suitability of the results.

7 -To determine the student the credibility of the mathematics discussions and the reasonableness the results

C - Interpersonal skills and responsibility:

1 – gining skills of personal success and factors to ensure career success.

2 – The study and understanding the issues , the ethical and professional responsibilities, , security, legal and societal associated with specialization.

3 - To acquire and develop teamwork skills.

4 - To acquire the skill of self-reliance and self-learning ability

D - Communication skills, information technology and numerical skills :

1 - The use of modern technology in the presentation and report writing .

2 - Ability to demonstrate effective time management and employment has correctly.

3 - To deal with a wide range of modern technological devices .

4 - The use of modern techniques in communicating with others and fruitful cooperation with them in a professional manner .

5 - Discover how to use the technology in the exploration and creation of new ideas, identify trends , and forecasting .

6 - Gain fluency in foreign languages and tha solutions based on the mathematics

7 - To discuss positive trends towards the use of technology , as well as the responsible use of information.

8 - The application of modern technology , and the statement of its efficet on civic participation , democratic processes , and the environment.

9-Using the basics of statistical methods and a mathematical techniques in the study field

E - psycho-motor skills

No
9-link the program with the University's vision
1- There is a close link between the University's vision and math program where the vision of the university include excellence in education, scientific research and community service in the field of mathematics
1- Employers expected graduates
2- working in a public and private education. 2 - Work as demonstrator in the mathematics departments in Saudi universities. 3- work in research centers. 4 - work in the military. 5 - Work in Information Technology ,data as analysts and shareholders in the preparation of strategic plans

Third: The relationship program with other programs within the department and the college: (model B + C model)

1 - What are the programs that are taught in the department or college and related with the modified program

Program name		Belonging to the department or college	The number and percentage of common hours
1	No	No	No

2 - What is the expected learning outcomes of the programs (according to the National Commission for Academic Accreditation and Evaluation)

Should be obtaining a bachelor's degree in science in mathematics have proved the following:

1- a comprehensive set of knowledge and a consistent organization of knowledge in the field of mathematics, theories and principles related field.

2 - Ability to search in complex problems and finding innovative solutions

under a limited amount of guidance , using the insights of their field of study of mathematics and other areas of the relationship.

3 - The ability to identify and use mathematical methods , appropriate statistical analysis , to find solutions to complex issues , and the ability to select and use the most appropriate mechanisms for the delivery of results to different recipients .

4 - leadership ability and willingness to fully cooperate with others in projects and joint initiatives .

5 - acquiring a deep knowledge and understanding of a comprehensive literature research in the area of specialization , in addition to the ability to interpret a,analyze and evaluate the importance of such research to increase knowledge in the field of study .

3- What are the proportions of the completion of the study plan for the program by the university and the college and the department?

Authority	Completion rate (%)	credit hours
University	%8.75	12
College	%21.17	29
Departments	72.99%	94
Others **Free**	1.45%	2
Total	100	137

4-What is the ratio of the completion of the courses in the other departments of the program (%): □ √ 5 □ 10 □ 15 □ 20 □ 25 □ 30 □ 35 □ other (Mention)

1- What are the tracks or specializations available in the program:

Mathematics

Fourth: Study Plan for the program: (model c)

Compulsory and optional requrements

Request	Request type	Total Cridit hours	The presentage of total credit Hours	Notes
University	Compulsory	12	8.75%	
College	Compulsory	29	21.16%	
	Compulsory	---------	----------	
Department	Compulsory	84	61.31%	
	optional	10	7.29%	
Free Course		2	1.45%	
All total credit hours and presentage		137	100%	

University Requrements

Course Code	Course Name	Units Distribution				Prerequisite	Notes
		L	E	P	Credits		
SALM 101	Islamic culture	2	0	0	2	----	Compulsory
SALM 102	Islam and society construction	2	0	0	2	----	Compulsory
SALM 103	Islam of economic system	2	0	0	2	----	Compulsory
ARAB101	Language Skills	2	0	0	2	----	Compulsory
.....	University Elective	2	0	0	2	.....	Elective
.....	University Elective	2	0	0	2	.....	Elective

Compulsory requirements of the college:

Course Code	Course Name	Units Distribution				Prerequisite	Notes
		L	E	P	Credits		
PENG 111	English Language 1	2	0	6	8		
PENG 121	English Language 2	2	0	4	6	PENG111	Compulsory
PMTH 112	Introduction to Mathematics 1	2	1	0	2		Compulsory
PMTH 127	Introduction to Mathematics 2	4	0	0	4	PMTH 112	Compulsory
PPHS 128	Physics	2	0	1	3		Compulsory
PCOM 113	Computer Skills	1	0	1	2		Compulsory
PENG 123	Scientific and Engineering English Language	1	0	1	2		Compulsory
PSSC114	Communication and Education Skills	1	0	1	2	----	Compulsory

Optional College

Course Code	Course Name	Units Distribution				Prerequisite	Notes
		L	E	P	Credits		

Compulsory requirements of the program:

Course Code	Course Name	Units Distribution				Prerequisite	Notes
		L	E	P	Credits		
MATH 231	Mathematics Basis	3	1	0	4	PMTH 127	Prerequisite

STAT201	Statistics and probability(1)	2	1	0	3	PMTH 127	Prerequisite
MATH 201	Calculus 1	3	1	0	4	PMTH 127	Prerequisite
MATH 271	Introduction to geometry	2	1	0	3	PMTH 127	Prerequisite
MATH 202	Calculus 2	3	1	0	4	MATH 201	Prerequisite
MATH 203	Calculus in several variables	3	1	0	4	MATH 202*	Simultaneously
MATH 204	Vector Calculus	3	1	0	4	MATH271+ MATH 202*	Prerequisite + Simultaneously
MATH 241	Linear Algebra 1	3	1	0	4	MATH 231	Prerequisite
MATH 321	Introduction to Differential Equation	3	1	0	4	MATH203	Prerequisite
MATH 351	Numerical Analysis 1	3	1	0	4	MATH 241 +MATH 21*	Prerequisite + Simultaneously
MATH 352	Linear Programming	3	1	0	4	MATH 241	Prerequisite
MATH 353	Mathematical application in computer	1	1	0	2	MATH203+ MATH351 *	Prerequisite + Simultaneously
MATH 322	Mathematical Methods	3	1	0	4	MATH 321	Prerequisite
MATH 342	Group Theory	3	1	0	4	MATH 241	Prerequisite

Course Code	Course Name	Units Distribution				Prerequisite	Notes
		L	E	P	Credits		
STAT302	Statistics and probability 2	3	1	0	4	STAT 201 + MATH 203	Prerequisite
MATH 381	Real Analysis 1	2	1	0	3	MATH 203	Prerequisite
MATH 423	Partial Differential Equations	3	1	0	4	MATH 321	Prerequisite
MATH 443	Rings and Fields	2	1	0	3	MATH 342	Prerequisite
MATH 472	Introduction to Topology	2	1	0	3	MATH 381	Prerequisite
MATH 473	Introduction to Differential Geometry	3	1	0	4	MATH 241 +MATH 204	Prerequisite
MATH 483	Complex Analysis	3	1	0	4	MATH381+ MATH 203	Prerequisite
MATH 484	Introduction to functional analysis	2	1	0	3	MATH 472	Prerequisite
MATH 499	Project	2	2	0	4	Pass 100 credit Hours	

Optional program requirements: (student chooses 10 credit hours):

Course Code	Course Name	Units Distribution				Prerequisite	Notes
		L	E	P	Credits		
MATH344	Number Theory	2	0	0	2	MATH 231	Prerequisite

MATH332	Graph Theory	2	0	0	2	MATH 231	Prerequisite
MATH345	Linear Algebra 2	2	0	0	2	MATH 241	Prerequisite
Course Code	**Course Name**	**Units Distribution**				**Prerequisite**	Notes
		L	**E**	**P**	**Credits**		
MATH433	Mathematical logic	2	0	0	2	MATH 231	Prerequisite
MATH485	Fourier Analysis	2	0	0	2	MATH 423 +MATH 483	Simultaneously + Simultaneously
MATH334	Discrete Mathematics	2	1	0	3	MATH 231	Prerequisite
MATH454	Optimization Technique	2	1	0	3	MATH 352	Prerequisite
MATH405	Calculus of Variation	2	1	0	3	MATH 321	Prerequisite
MATH482	Real Analysis 2	2	1	0	3	MATH 381	Prerequisite
MATH335	Mathematics History	2	0	0	2	MATH 231	Prerequisite
MATH412	Topics in Applied Mathematics	2	1	0	3	MATH 321	Prerequisite
MATH311	Financial Mathematics	2	0	0	2	MATH 202	Prerequisite
MATH455	Numerical Analysis 2	2	1	0	3	MATH 351	Prerequisite
STAT404	Data Analysis	2	0	0	2	STAT 302	Prerequisite

STAT303	Inventory Models	2	0	0	2	STAT 302 +MATH 352	Prerequisite

Training requirements (training courses or education or practical experience in the field)

Course Code	Course Name	Units Distribution				Prerequisite	Notes
		L	E	P	Credits		
	Students are trained in one of the government agencies or private commensurate with the specialization and the duration of training of not less than six weeks, with at least four hours a week, and that addresses the training college where the student letters of formal clarifying the quality of training and the extent of the commitment of the student and progress.					Pass 100 credit Hour	

D. Program Structure and Organization

1 Program Description.

Level 1

Course Code	Course Name	Units Distribution				Prerequisite	Notes
		L	E	P	Credits		
PENG 111	English Language 1	2	0	6	8	----	
PMTH 112	Introduction to Mathematics 1	2	1	0	2	----	
PCOM 113	Computer Skills	1	0	1	2	----	
PSSC 114	Communication and Education Skills	1	0	1	2	----	
Total of credit Units		Units 14					

Level 2

Course Code	Course Name	Units Distribution				Prerequisite	Notes
		L	E	P	Credits		
PENG 121	English Language 2	2	0	4	6	PENG111	
PMTH	Introduction to Mathematics 2	4	0	0	4	112 PMTH	

127							
PENG 123	Scientific and Engineering English Language	1	0	1	2	PENG111	
PPHS 128	Physics	2	0	1	3		
Total of credit Units		Units 15					

Level 3

Course Code	Course Name	Units Distribution				Prerequisite	Notes
		L	E	P	Credits		
231MATH	Mathematics Basis	3	1	0	4	PMTH 72 1	
201STAT	Statistics and Probability1	2	1	0	3	PMTH 72 1	
201MATH	Calculus 1	3	1	0	4	PMTH 72 1	
271MATH	Introduction to Geometry	2	1	0	3	PMTH 72 1	
ARAB101	Language Skills	2	0	0	2	----	
SALM 101	Islamic culture	2	0	0	2	.....	
Total of credit Units		Units18					

Level 4

Course Code	Course Name	Units Distribution				Prerequisite	Notes
		L	E	P	Credits		
MATH 202	2Calculus	3	1	0	4	201 MATH	
203MATH	Calculus in Several Variables	3	1	0	4	*202 MATH	(*) simultaneously
204MATH	Vector Calculus	3	1	0	4	* 202 MATH 271 +MATH	Simultaneously (*)
241MATH	Linear Algebra 1	3	1	0	4	231 MATH	
…….	University Elective	2	0	0	2	------	
Total of credit Units		Units 18					

Level 5

Course Code	Course Name	Units Distribution				Prerequisite	Notes
		L	E	P	Credits		
321MATH	Introduction to Differential Equations	3	1	0	4	203MATH	
351MATH	Numerical Analysis 1	3	1	0	4	241MATH	Simultaneously

						*321MATH+	(*)
352MATH	Linear Programming	3	1	0	4	241MATH	
353MATH	Mathematical applications in Computers	1	1	0	2	203MATH *351+MATH	Simultaneously (*)
----	Department Elective	2	0	0	2	-	
2SALM10	Islam and society construction	2	0	0	2	SALM 101	
Total of credit Units		Units 18					

Level 6

Course Code	Course Name	Units Distribution				Prerequisite	Notes
		L	E	P	Credits		
322MATH	Mathematical Methods	3	1	0	4	321MATH	
MATH 342	Group Theory	3	1	0	4	241 MATH	
STAT302	)2Statistics and probability (	3	1	0	4	201 STAT 203 MATH+	
381MATH	Real Analysis 1	2	1	0	3	203 MATH	
---------	Department Elective	2	1	0	3	---	
Total of credit Units		Units 18					

Level 7

Course Code	Course Name	Units Distribution				Prerequisite	Notes
		L	E	P	Credits		
423MATH	Partial Differential Equations	3	1	0	4	321 MATH	
MATH443	Rings and Fields	2	1	0	3	342 MATH	
472MATH	Introduction to Topology	2	1	0	3	381 MATH	
473MATH	Introduction to Differential Geometry	3	1	0	4	241 MATH 204 MATH+	
SALM 103	Islam Economic System	2	0	0	2	SALM 101	
-------	Department Elective	2	0	0	2	---------	
-------	Field training	0	0	0	0	Pass 100 Units	
Total of credit Units		Units 18					

Level 8

Course Code	Course Name	Units Distribution				Prerequisite	Notes
		L	E	P	Credits		
.....	Department Elective	2	1	0	3	.....	
MATH 483	Complex Analysis	3	1	0	4	381 MATH	
484MATH	Introduction to functional Analysis	2	1	0	3	472 MATH	

---	University Elective	2	0	0	2		
499MATH	Project	3	0	0	3	Pass 100 Units	
---	Free course	3	0	0	3		
Total of credit Units		Units 18					

Fifthly - program specification and description of courses: (model b+ model h + model y)
Characterization is the program according to the National Assessment and Accreditation: (repeats the form below for each course in the study plan)

- **Courses Description of the first level (preparatory 1)**
- **Courses Description of the second level (preparatory 2)**

Courses Description of the third level

Model (5)

Summary Course Description

Course Name Mathematics Basis	Course Code: MATH231
Prerequisite:PMTH127	Teaching language: English
Course Level:3rd	Credit Hours: 4 hours

Module 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-Rings and their properties - polynomials ring - Partial fractions-Field and their properties

Module Aims

- Studying Introduction to Mathematical Logic- Methods of proofs
- learning Mathematical Induction and recognize the concepts of Set theory- The product of a sets- Binary operations- Equivalence Relations - Equivalence Classes and Partitions – Mappings
- Learning the images and inverse images of a sets under mappings - Equivalence Sets- Countable and finite sets
- Studying the concepts of Binary operations-homeomorphisms- Definition and examples of groups- definition and examples of rings and fields-Polynomials-Partial fractions.perties .

Educational outcomes: (understanding, knowledge and mental skills and practical

After this course supposed that the student is able to

The students recognize the Introduction to Mathematical Logic- Methods of proofs-Mathematical Induction- Set theory-The product of sets- Binary operations Equivalence Relations - Equivalence Classes and Partitions – Mappings -The images and inverse images of a sets under mappings - Equivalence Sets- Countable and finite sets. Binary operations- homeomorphisms- Definition and examples of groups- definition and examples of rings and fields-Polynomials-Partial fractions

Course Contents

Subject list	Weaks Noumber	Teaching hours
Mathemaical logic	1	4
Mathematical inducation	1	4
Sets	1	4
Functions	1	4
The relations	3	12
Group	2	8
Rings	2	8
Filds	2	8
Partial Fractions	1	4

Textbook and reference assistance

Book's name	Author Name	Publisher	Year of Publication	ISBN
Discrete Mathematics and	Kenneth H. Rosen	WCB/Mc Graw-Hill	2012	0073383090

Its Applications				13:978-0072899054
A Book of ract Abs Algebra: Second Edition	J. Mathos, R. Campanha	McGraw Hill	1990	486--10:047417-8 - 13:978486--047417-5

Model (5)

Summary Course Description

Course Name :(Calculus 1)	Corse Code: MATH201
Prerequisite:PMTH127	Teaching language: English
Course Level:3rd	Credit Hours: 4 hours

Module 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 Role's Implicit Differentiation – Lohospital's Role - Rolle's Role and the Mean Value Theorems - Using Differentiation to studying concavity of functions and studying some applications of Differentiation.

Module Aims

- Have a knowledge of a line of the real numbers and how solving an Inequalities.
- Have the knowledge of the function of one variable and studying its properties and kinds also how to draw the curve of the function
- Have knowledge of how to find limit of the function and studying its Continuous.
- From this course the student can find the derivative of the function and studying the relationship between Differentiation and Continuity
- Have knowledge of finding the tangent of the curve and the maximum and minimum values of the function.
- Have a knowledge of how the function increased and decreased and draw it also shape of the curve

Educational outcomes: (understanding, knowledge and mental skills and practical

-After this course supposed that the student is able to

- Have the knowledge of the function and its properties and its different kinds.
- Have knowledge of how to find the limit of a function and studying its continuity.
- Have a knowledge of the derivative of a function and derivatives of different types of functions
- Have knowledge of finding the equation of tangent and normal of a curve and the maximum and minimum values of the function.

  - learning curve sketching

Course contents

Subject list	Weaks Noumber	Teaching hours
Real numbers	1	4

Functions	2	8
Limites	2	8
Continuous	1	4
Derivatives	4	16
Applications of derivatives	4	16

Textbook and reference assistance

Book's name	Author Name	Publisher	Year of Publication	ISBN
Calculus	Smith/Minton	Mc Graw Hill	2012	9780071 316576
Single Variable Calculus : Early Transcendentals seventh edition	James Stewart	Cengage learning	2011	13:978 -0-538-49857-8 0:978 -0-538-49867-6

Model (5)

Summary Course Description

Course Name : Statistics and Probability 1	Course code :STAT 201
Prerequisite:PMTH127	Teaching language: English
Course Level:3rd	Credit Hours: 3 hours

Module Description

Definition of statistics - Organization and presentation of statistical data - Measures of central tendency (Mean, Median, Mode, ...) of the simple data and the frequency distribution- Measures of dispersion - Sample space and Events - Counting Techniques - Definition of the probability and its applications- Conditional probability - Independence of events - Bayes theorem and its

applications - random variable- probability Distribution- Some special probability distributions -The Normal distribution.

Module Aims

- Definition of statistics, population and sample.
- Understanding the concept of statistics and the parameter
- Introducing basic statistical methodology of data analysis including; graphs, descriptive statistics
- Deducing measures of location and dispersions (mean and variance)
- Interpret probabilities and use probabilities of outcomes to calculate probabilities of events in discrete sample spaces- exclusive and independent events
- The purpose of the random variable , some discrete and continuous distributions

Educational outcomes: (understanding, knowledge and mental skills and practical

-After this course supposed that the student is able to

- Describing basic concepts of data analysis (discrete and continuous)
- Interpreting the sum deviations of data about its mean is equal to zero
- Finding statistical problems, data analysis and interpreting the results
- The importance of counting methods in probability theory
- Understanding properties of the normal distribution of the data

Course contents

Subject list	Weaks noumber	Teaching hours
Definition of statistics - Organization and presentation of statistical data -	2	6
Measures of central tendency (Mean, Median,	1	3

Mode, …) of the simple data and the frequency distribution		
Measures of dispersion	2	6
Sample space and Events - Counting Techniques	2	6
Definition of the probability and its applications- Conditional probability	2	6
Independence of events - Bayes theorem and its applications -	1	3
random variable- probability Distribution- Some special probability distributions -The Normal distribution.	4	12

Textbook and reference assistance

Book's name	Author Name	Publisher	Year of Publication	ISBN
Applied Statistics and Probability for Engineers. seventh edition	D.C. Montgomery & G. C. Runger	John Wiley & Sons.	2011	13:978 -0-470-05304-1
A Modern Introduction to Probability and Statistics	Frederik MIChel Dekking Cornelis Kraaikamp Hendrik Paul ¨Lopuhaa Ludolf Erwin Meester	Springer-Verlag London Limited	2005	13: 978-1-85233-896-1

Model (5)

Summary Course Description

Course Name ;Introduction to	Course Code :MATH271

Geometry	
Prerequisite:PMTH127	Teaching language: English
Course Level:3rd	Credit Hours: 3 hours

Module 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 sections 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 paraboloid – Hyperbolic paraboloid).

Module Aims

-Having the knowledge of different coordinates in plane and space
- Having the knowledge of the line and circle.
- Having the knowledge of conic sections in general form.
- Having the knowledge of plane and straight line in space
- Getting the knowledge of quadric surfaces (Cylinder- Cone – Sphere – Ellipsoid – Hyperboloid of one sheet – Hyperboloid of two sheets – Elliptic paraboloid – Hyperbolic paraboloid).

Educational outcomes: (understanding, knowledge and mental skills and practical

-After this course supposed that the student is able to

-Having the knowledge of different coordinates in plane and space
- Having the knowledge of the line and circle.
- Having the knowledge of conic sections in general form.
- Having the knowledge of plane and straight line in space
- Having the knowledge of quadric surfaces (Cylinder- Cone – Sphere – Ellipsoid – Hyperboloid of one sheet – Hyperboloid of two sheets – Elliptic paraboloid – Hyperbolic paraboloid).

Course Contents

Subject List	Weaks	Teaching

	numbers	hours
The Cartesian and polar coordinates – The straight line in its different forms – Equation of two straight lines	2	6
Transformation and rotation of axes– The circle – Conic sections in general form.	3	9
Rectangular, spherical and cylindrical coordinates – The distance between two points- Direction cosines of a line – Angle between two lines	2	6
The plane in space – The line in space	2	6
Cylinder - Cone – Sphere	2	6
Ellipsoid – Hyperboloid of one sheet – Hyperboloid of two sheets – Elliptic paraboloid – Hyperbolic paraboloid	3	9

Textbook and reference assistance

Book's name	Author Name	Publisher	Year of Publication	ISBN
Algebra and Trigonometry with Analytic Geometry	Earl W. Swokowski , Jeffery A.Cole	Cengage Learning	2011	10: 0840068522 13: 978-0840068521
Calculus and Analytic Geometry (9th Edition)	George B. Thomas; Ross L. Finney	Addison Wesley	1995	13: 978-0201531749

Courses Description of the Forth level

Model (5)

Summary Course Description

Course Name :Calculus 2	Course code :MATH202

Prerequisite :MATH201	Teaching language: English
Course Level: 4th	Credit Hours: 4 hours

Module Description

Definite 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.

Module Aims

- Studying Definite integral and its properties.
- Studying the mean value theorem of integral.
- Studying the fundamental theorem of Calculus.
- Having the knowledge of Indefinite integral and Standard integrals.
- Having the knowledge of integrals of hyperbolic and inverse hyperbolic functions.
- Having the knowledge of Integration technique.

Educational outcomes: (understanding, knowledge and mental skills and practical

-After this course supposed that the student is able to

Integration of the basic functions.
Integration of hyperbolic functions.
Integration of the inverse hyperbolic functions.
Acquiring skill in the use of various methods of integration.
Calculating areas and volumes using definite integration.

Course Contents

Subject List	Weaks numbers	Teaching hours
Definite integral and its propartie, the mean value thorem of itegration- basic theorem of calculus	2	8
The indefinite integral- the integration of the basis founctions –the differenation and integration of the hyperbolic function and inverse hyperbolic function	2	8
Integral Methods : Substituation mjethod- by parties , trigonometric substitutation- complaeting squre –Partial fracture- the integration of fractuonal functions- an other Substituation	3	12
Lupotal's Rule – improber integrals	2	8
The areas and sizes of objects rotational - the length of the arc of the curve - numerical integration using the trapezoidal method	3	12
Polar Coordinates- graph of polar coordinate – using polar coordinate to find the area	2	8

Textbook and reference assistance

Book's name	Author Name	Publisher	Year of Publication	ISBN
Calculus	Smith/Minton	Mc Graw Hill	2012	9780071316576

Calculus and analytical Geometry(9th (Edition)	George B. Thomas,Ross L. Finney	Addison-Wesley publishing company	1996	0-201531747

Model (5)

Summary Course Description

Course name :Linear Algebra 1	Course Code: MATH241
Prerequisite : MATH231	Teaching language: English
Course level:4th	Credit Hours: 4 hours

Module Description

Matrices and their operations- inverse of matrix – Matrices and system of linear equations – Echelon matrix.
Vector spaces- Linear subspaces- Linear Combinations and spans – Sum and direct sum
Linear dependence and linear independence – basis and dimension– dimension and subspaces - rank of matrix –application to linear equations – coordinates
Linear mappings- Kernel and image of a linear mapping- Rank of linear mapping – Nullity of linear mapping – operations with linear mapping.
Determinants and its properties -Minors and cofactors - Classical adjoin- Inverse of a matrix- Rank of matrix- Linear systems of equations.
Polynomial of matrices - Eigenvalues and eigenvectors of a matrix - Diagonalization and eigenvectors – Characteristic polynomial – Cayley Hamiltion theorem.

Module Aims

1. Having the knowledge of matrices and operations on them.
2. Having the knowledge of vector spaces, subspaces and their properties
3.Solving a system of homogeneous and non homogeneous linear equations
4.Having the knowledge of the basis and dimension of the vector space
5. Having the knowledge of Linear mapping.
6. Having the knowledge of Eigen values and eigenvectors of a matrix and their properties.
7. Studying determinants to compute the inverse of a matrix.

Educational outcomes: (understanding, knowledge and mental skills and practical

-After this course supposed that the student is able to

- To learn the fundamental basis in linear algebra such as: Systems of linear equations, matrices, Vector spaces and calculations of eigenvalues and eigenvectors.
- To improve logical thinking.
- To get the ability to explain physical problems mathematically.

Course Content

Subject List	Weaks numbers	Teaching hours
Matrices	2	8
Vector Spaces and vector subspaces	3	12
Basis and dimantions of vector spaces	3	12
Linear transformationms	2	8
determinate	2	8
Eigenvalues and eigen functions	2	8

Textbook and reference assistance

Book's name	Author Name	Publisher	Year of Publication	ISBN
Linear algebra	schaum Seymour Lipschutz, Marc Lipson	Mc Graw Hill	2012	10: 0071794565 13 978-0071794565
Introduction to Linear Algebra, 4th Edition	Gilbert Strang	Wellesley-Cambridge Press	2009	International Edition:

Model (5)

Summary Course Description

Course name : Vectors Calculus	Course code : MATH 204
Prerequisite : MATH 271 +MATH202 (Simultaneously)	Teaching language: English
course level:4th	credit hours:4 hours

Module Description

- Vectors fields:
- Vectors 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 rectum 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.

Module Aims

-To know the concept of the vector in two and three dimensions

-To know the methods of calculating basic operations on vectors and calculate the scalar multiplication and vector

-To know the methods of calculating the linear bending and integration on the surface

-To know some of the applications on the integrals achieve theories Green ,Stokes and Gauss divergence

Educational outcomes: (understanding, knowledge and mental skills and practica

- After this course supposed that the student is able to

- Algebraic operations, scalar and vector product of vectors in two or three dimensions
- Finding the equations of the straight line and plans in the three dimension space
- Calculating Function domain for a real variable vector and checking function limits and continuity.
- Calculating the curvature (bending) and orthogonal curvilinear coordinates to a curve in the space
- Derivation of directional derivative and decline of a function
- Calculating of linear and surface integrals.
- Achieving the opposite theory in the plane(Green's theory)
- Achieving Stokes theory
- Achieving of the Gaussian theory spacing

Course Content

Subject List	Weaks numbers	Teaching hours
- Vectors fields: - Vectors fields in two-three dimensions	1	4
- Algebraic operations on vectors. Definitions of gradient- divergence- curl on the vectors.	2	8
- Provide the basic elements of analytical geometry- plans and lines in three dimensional space and surfaces - Equation of tangent and rectum governing on the surface.	3	12
- Calculating the dimensional derivatives-Vector functions - functions on one variable	2	12
- Curvilinear: curvilinear coordinates - orthogonal curvilinear coordinates: line integral- surface integral- volume integral .	3	12
Relationship between line integral- surface integral- volume integral and theorems Gausses-Green- Stokes	3	12

Textbook and reference assistance

Book's name	Author Name	Publisher	Year of Publication	ISBN
Vector Calculus	Susan Jane Colley	Pearson	011	0321780655

or Vec Calculus	MIChael Corral	Schoolcraf t College	2008	B0 6DTH4MY

Model(5)

Summary Course Description

Course name: Calculus in Several variables	Course code:MATH203
Prerequisite : MATH 202 Simultaneously	Teaching language: English
course level:4th	credit hours:4 hours

Module 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.

Module Aims

This course aims to generalize the concepts of functions with single variable to functions with multiple variables and identify different applications.

Educational outcomes: (understanding, knowledge and mental skills and

practica

- After this course supposed that the student is able to

- Identify the functions in more than one variable and their properties
- Partial knowledge of calculus-Knowledge of the properties of double and triple integration in different coordinates-
- series properties in terms of convergence and divergence
- Unscrewed Taylor and Maclaurin.

Course Content

Subject List	Weaks numbers	Teaching hours
Cartesian, cylindrical and spherical coordinates-	2	8
Functions of two or more variables-Domain of the function-three dimension rectangular coordinates-Chain rule-Limits-Continuity-	2	8
Partial derivative-Higher order partial derivatives-Differentiation of composed function- Maxima and minima-Method of Lagrange multipliers for maxima and minima.	3	12
Double integrals in Cartesian and Polar coordinates -	3	12
Triple integrals in spherical and cylindrical coordinates-	2	8
Sequences and .Infinite series- convergence tests-Representation of functions by power series- Taylor and Maclaurin and the binomial series	2	8

Textbook and reference assistance

Book's name	Author Name	Publisher	Year of Publication	ISBN
Calculus of one and several Variables, Ninth Edition	Salas,Hille,Etgen	John Wiley &Sons, New York	2003	0471-23120-7

Multivariable Calculus7th edition	James Stewart	Brooks Cole	2011	978-053□497879

Courses Description of the Five level

Model (5)

Summary Course Description

Course name: Introduction to Differential Equations	Course code MATH321
Prerequisite : MATH203	Teaching language: English
course level:5th	credit hours4:

Module 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.

Module Aims

- This course is primarily designed for undergraduate students studying Mathematics.
- Deriving ODEs that describe various phenomena in physics, mechanics, chemistry, biology, etc.

- Learning various methods for solving a great variety of differential equations
- Upgrading the skills of the student to understand physics, mechanics, chemistry, biology

Educational outcomes: (understanding, knowledge and mental skills and practica

- After this course supposed that the student is able to

- Recognizing the differential equation and its order and degree.
- Recognizing the methods of solving differential equations of the first order.
- Recognizing the applications of differential equations of growth problem and perpendicular tracks
- Recognizing methods of solving differential equations of higher order and the properties of solutions.
- Recognizing the Laplace's transform and its properties and how to use them in solving differential equations.

Course Content

Subject List	Weaks numbers	Teaching hours
Basic concepts: Definitions. Classifications of ODEs. Solutions types. Origin of ODEs. Basic First-order differential equations -	1	4
. Methods of solutions - Separable variables - Homogeneous equations - Exact equations	2	8
Linear equations	1	4
Equations of Bernoulli - Ricotta. Substitutions - Picard's methods	1	4

Orthogonal pathes – Grothing problem	1	4
The ordinary differential equation of higher order – fundmental theorem (independent solutions)- Warnskian- homogenuous and nonhemgenuous equations	1	4
- Linear differential equations of higher-order - Homogeneous equations with constant coefficients,	2	8
Method of undetermined coefficients, Method of variation of parameters. Differential equations with variable coefficients, Cauchy-Euler equations -.	1	4
Laplace Transform - Applications of Laplace transform to solve ordinary differential equations	3	12
Solution of ordinary differential equation by bower series	1	4

Textbook and reference assistance

Book's name	Author Name	Publisher	Year of publication	ISBN
□rdinary Differential Equations	William A Adkins, Mark G Davi□son	Springer	2012	1461436176 13: □97814614 6171
Schaum's Outline of Differential Equations,3rd edition	Richard Bronson ,Gabriel Costa	McGraw-Hill	1994	10: 0071456872 13: 978-0071456876

Model (5)

Summary Course Description

Course name : Numerical Analysis1	Course code:MATH351
Prerequisite: MATH241 + MATH321 (Simultaneously)	Teaching language: English
course level:5th	credit hours4 :

Module 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.

Module Aims

- Having the knowledge of the ways to solve some problems in numerical ways using computers.
- Having the knowledge of how to find the derivatives and integrations using numerical methods
- Having the knowledge of how to solve matrix with large dimensions
- Having the ability of interpolation to functions and how to find a function if we know only some points
- Using numerical methods to solve integrations which have no known solutions
- Solving some problems - making some research in Libraries and using

internet

Educational outcomes: (understanding, knowledge and mental skills and practica

-After this course supposed that the student is able to

- Solving some problems in numerical ways using computers.
- Finding the derivatives and integrations using numerical methods
- solving matrix with large dimensions
- making interpolation to functions and how to find a function if we know only some points
- solving integrations which have no known solutions-making some search in Libraries and using internet

Course Content

Subject List	Weaks numbers	Teaching hours
Numerical methods for solving nonlinear equations (bisection – iteration – Newton - false position …)- errors and rates of convergence-	3	12
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-	3	12
Polynomials interpolation (Lagrange-Newton's methods: divided differences- forward and backward differences) and analysis of errors	3	12

Numerical differentiation - errors and accuracy- Gaussian	2	8
Numerical differentiation and integration- errors and accuracy- Gaussian integration formulas-	2	8
Euler and Taylor methods for solving differential equations of first order.	1	4

Textbook and reference assistance

Book's name	Author Name	Publisher	Year of publicat ioon	ISBN
Numerical Analysis. 9th ed.	R.L. Burden and J.D. Faires:	Edition Brooks / cole	2011	13: 978-0-538-73563-6
An Introduction to Numerical Analy□is	Endre Süli, David F. Mayers	Cambridge	2003	0521810264 0521007941

(Model (5

Summary Course Description

Course name: Linear Programming	Course code :MATH352
Prerequisite: linear algebraMATH241	Teaching language: English
course level:5th	credit hours:4

Module 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.

Module Aims

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

Educational outcomes: (understanding, knowledge and mental skills and practica

- After this course supposed that the student is able to

- Recognizing the Operations Research and the mathematical modeless of some actual problems.
- Knowing how to form the mathematical models of the linear programming problems.
- Knowing the convex sets, convex functions and concave functions, polygons, vertex points and the theory of optimization-Knows different methods for solving the linear programming problem.
- Concluding the duality problem and its solution.

Course Content

Subject List	Weaks numbers	Teaching hours
Introducation of operation researches – the mathematical model of live problem – the mathematical formulation of the linear programming	2	8
Convex sets –convex and concave function – polgen –vertex point-optimization theory	2	8
Graph methods – analytical method for solving linear prigramming –(Simplex method – M-techinque)	3	12
Two phases – revised simplex method	2	8
Duality liear programming- Sinctivity analysis	2	8
Application of linear programming (transportation Problems- Network)	3	12

Textbook and reference assistance

Book's name	Author Name	Publisher	Year of publication	ISBN
Linear Programming: Methods and Applications -Outline of Operations Research	Saul L,Gass	Dover publication	2013	-456-0 z64-x43
Introduction to Operations Resear	Frederick S. Hillier; Ger ald J.	McGraw-Hill Science/ Engineerin	2009	10: 007729834 9 / 0-07-

	Lieberman	g		729834-913: 9780077298340

(Model (5

Summary Course Description

Course name: Mathematical Application in computer	Course code :MATH353
Prerequisite : +MATH351203MATH	Teaching language: English
course level:5th	credit hours:2

Module 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

Module Aims

- The student acquires knowledge the following:
- The principles of the use of mathematical programs Mat lab and Mathematical for mathematical calculations and programming for calculus and linear algebra.
- The use of the Internet for scientific research and the basics of writing reports and scientific research using scientific the workplace and presentation skills.

Educational outcomes: (understanding, knowledge and mental skills and

practica

- After this course supposed that the student is able to

Upon completion of this course the student is supposed to be able to use a mathematical software - Calculation of derivatives of functions of different ranks - Evaluation of definite and indefinite integrals - Calculation of determinants - Implementation of algebraic operations on Mathematics - Calculation of the inverse matrix - Solving a system of linear equations - Editing Mathematical reports or texts scientific workplace editor - Providing reports and texts on power point presentations.

Course Content

Subject List	Weaks numbers	Teaching hours
Making optimal use of technology in the consolidation of mathematical concepts - dealing with mathematical software and use them to solve problems. - Conclusion skills and analysis	3	6
Using the mathemtica program to calculate the differenation and integration and writting mathematical programs to solve mathematical problems using the computer	3	6
Using the mathemtica program in linear algebra	3	6
Introducation to matlap program and its applications	3	6

- Learn the skills of scientific research and oral recitation skills	2	4

Textbook and reference assistance

Book's name	Author Name	Publisher	Year of publication	ISBN
Mathematical a system for doing mathematics by computer5th	Wolfram, Stephen	Addison-Wesley Publishing Company,Inc	2008	0-201-51502-4
MATLAB PROGRAMMING	Y. KIRANI SINGH, B. B. CHAUDHURI	Prentice-Hall of India	2007	978-81-203-3081-8

Courses Description of the 6th level

Model (5)

Summary Course Description

Course name : Mathematical Methods	Course code :MATH322
Prerequisite321 -: MATH	Teaching language: English
course level:6th	credit hours: 4hours

Module Description

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

Module Aims

- This course aims to use various mathematical methods to solve Ordinary Differential Equations
- This course aims to use various mathematical methods in solving partial differential equations
- Solution of differential equations using Laplace transforms

Educational outcomes: (understanding, knowledge and mental skills and practica

- After this course supposed that the student is able to

- Dealing with linear differential equations with variable coefficients and using to study some special functions –Fourier integrals
- Laplace transforms study

Course Content

Subject List	Weaks numbers	Teaching hours
Improper integral	1	4
Bessal Function	2	8
Gamma Function	1	4
Beata Function	1	4
Algebric function on infinite series	1	4
Lagender plynomials	2	8

Fourier series	2	8
Laplac transformation and inverse of Laplac transformation	2	8
The solution of differential equation by laplac transformation	2	8

Textbook and reference assistance

Book's name	Author Name	Publisher	Year of publication	ISBN
Second Order Differential Equations: Special Functions and Their Classification	Gerhard Kristensson	Springer	2010	10: 0486656497 13: 978-0486656496
Fourier Analysis and its Applications	Geral B. F Fourier Folland	Pacific Grove	Latest edition	978-0821847909

(Model (5

Summary Course Description

Course name: (Real Analysis 1)	Course code :MATH381
Prerequisite : MATH203	Teaching language: English
course level:6th	credit hours:3hours

Module Description

Basic Properties of the field of real numbers – completeness axiom - Series and their convergence – monotone sequences – Bolzano-Weirstrass theorem – Cauchy criterion- Basic topological properties of the real numbers- Limit of a functions – continuous functions and their properties – Uniform continuity - compact sets and its properties- The derivative of a function -Mean value theorem. L'Hospital rule-Taylor theorem. Cauchy theorem

Module Aims

- Studying basic properties of the field of real numbers – completeness axiom - series and their convergence – monotone sequence – Bolzano-Weirstrass theorem
- Learning Cauchy criterion- Basic topological properties of the real numbers- Limit of a function
- learning continuous functions and their properties – Uniform continuity and the difference between them
- Studying the concepts of compact sets and its properties
- Studying the derivative of a function, mean value theorem. L'Hospital rule-Taylor theorem.

Educational outcomes: (understanding, knowledge and mental skills and practica

- **After this course supposed that the student is able to**

- This course is interested to study the main concepts in basic Properties of the field of real numbers – completeness axiom - Series and their convergence – monotone sequence – Bolzano-Weirstrass theorem – Cauchy criterion-
- Recognize the basic topological properties of the real line
- Recognizing the concept of the limit of a function , continuous functions and their properties
- Recognizing the uniformly continuity, compact sets and its properties-
- Knowing the derivative of a function -Mean value theorem. L'Hospital rule-Taylor theorem.
- Recognizing the generalization of the mean value theorem such as L'Hospital rule-Taylor theorem

Course Content

Subject List	Weaks numbers	Teaching hours
Basic Properties of the field of real	2	6

numbers – completeness axiom		
- Series and their convergence – monotone sequences – Bolzano-Weirstrass theorem – Cauchy criterions	2	6
Basic topological properties of the real numbers and their properties	3	9
- Limit of a functions – continuous functions	1	3
– Uniform continuity - compact sets and its propertie	2	6
Analysis of differenation	1	3
- The derivative of a function -Mean value theorem. L'Hospital rule-Taylor theorem. Cauchy theorem	2	6

Textbook and reference assistance

Book's name	Author Name	Publisher	Year of publu =icati on	ISBN
Mathematical Analysis	kon□Elias Z	Trillia group	2011	978193170 502
Introduction to Real □Analysis	R .Bartle and D .Sherbert	John-Wiley□□d Sons	2011	978-0-471-43331-6

Model (5)

Summary Course Description

Course name:Statistics and probability 2	Course code :STAT203
Prerequisite : STAT201 203+ MATH	Teaching language: English

course level:6th	credit hours :4hours

Module Description

Some rules of probabilities and definition of the random variable- mathematical expectation – some discrete probability distributions- some continuous probability distributions- functions of random variable- bivariate random variables-sampling distributions

Module Aims

- Defining statistics, population and sample.
- Understanding statistics and the parameter
- Determine probabilities from probability mass functions and the reverse
- Understanding the assumptions for each of the discrete probability distributions presented. Select an appropriate discrete probability distribution to calculate probabilities in specific applications
- Approximating probabilities for some binomial and Poisson distributions
- Deducing the sampling distribution of the sample mean and showing that it is unbiased estimator of the population mean.

Educational outcomes: (understanding, knowledge and mental skills and practica

- After this course supposed that the student is able to

- Determining probabilities from probability mass functions and the reverse
- Determining probabilities from cumulative distribution functions
- Understanding the assumption
  For each of the discrete probability distributions presented.
- Selecting an appropriate discrete probability distribution to calculate probabilities in specific applications
- Standardizing normal random variables.
- Approximating probabilities for some binomial and Poisson distributions.

Course Content

Subject List	Weaks numbers	Teaching hours
Some rules of probabilities and definition of the random variable.	1	4
mathematical expectation	1	4
some discrete probability distributions	3	12
Some continuous probability distributions	3	12
Normal distribuation and its applications	1	4
A functions of random variables and moments	2	8
bivariate random variables	2	8
sampling distributions	1	4

Textbook and reference assistance

Book's name	Author Name	Publisher	Publication year	ISBN
Probability & Statistics for Engineers &	Ronald E. W. Raymond H. M.Sharon	Prentice Hall	2011	-321-0-978 1-62911

Scientists(9th edition)	L. M.Keying Ye			
WCS)Applied Statistics and Probability for , 4th Edition Engineer Binder Ready Version	Douglas C. Montgomery, George C Runger	John Wiley & Sons Canada	2007	0470729449, 9780470729441

(Model (5

Summary Course Description

Course name: Group Theory	Course code :MATH324
Prerequisite : MATH241	Teaching language: English
course level:6th	credit hours :4 hours

Module Description

Definitions and examples of groups , subgroups, Lagrange's theorem, normal subgroups, quotient (or factor) groups, cyclic groups, homomorphism, Isomorphism's theorems, Auto orphism, Cayley 's theorem and its generalization, Simple groups, SymmetrIC groups, , Group action on a set, Classes equation. p-groups, Cauchy's theorem, Solow's theorems, External and internal product of groups, Burnside's theorem, Dihedral groups, Quaternion's groups, Groups of auto orphisms of a finite and infinite groups.

Module Aims

- The student will be familiar with the concept of a group, the subgroup of a group and the notion of cyclic groups.
- The construction of a quotient set from a group and an equivalence relation on this group and the deduction of Lagrange's theorem.
- As a third aim, the introduction of normal subgroups permits us to construct new group (the factor group). We also define simple groups
- Introducing the concept of isomorphic groups and studying the isomorphism's theorems and finally as an application the Cayley's theorem
- P-groups, Cauchy's theorem
- Studying the group of auto orphisms, the action of a group on a set and the Solow's theorems.

- We study as a consequences of the previous section; Groups of auto orphisms of a finite and infinite groups.

Educational outcomes: (understanding, knowledge and mental skills and practica

- After this course supposed that the student is able to

- Acquisition of knowledge by studying some basic concepts and fundamental theorems of abstract algebra.
- Acquisition of some skills towards the reflection and the solving of some problems related the groups theory
- Applying the acquired knowledge in Basic Mathematics
- The student will be able to apply the principal concepts of group theory to solve problems related to groups in abstract algebra.

Course Content

Subject List	Weaks numbers	Teaching hours
Definitions and examples of groups , subgroups.	2	8
Lagrange's theorem, normal subgroups, quotient (or factor) groups, cyclic groups.	1	4
homomorphism, Isomorphism's theorems, Auto orphism, Cayley 's theorem and its generalization.	2	8
Simple groups, Symmetric groups,Group action on a set, Classes equation.	2	8

p-groups - Cauchy's theorem, Solow's theorems.	2	8
External and internal product of groups.	1	4
Burnside's theorem, Dihedral groups, Quaternion's groups	2	8
Groups of auto orphisms of a finite and infinite groups.	2	8

Textbook and reference assistance

Book's name	Author Name	publisher	Publication year	ISBN
Group Theory	W.R. Scott	Dover	2010	0486653773 13: 9780486653778
Introduction Group to Theory	Oleg Bogopolski	TU Dortmund, Germany	2008	97-3-03719-041-8

Courses Description of siven level

Model (5)

Summary Course Description

Course name: Partial Differential Equations	Course code :MATH423
Prerequisite : MATH321	Teaching language: English
course level:7th	credit hours: 4hours

Module Description

- Its Origin and classification - First-order equations and first degree– The solution by Lagrange method – Cauchy's Problem

- Linear equations of second order in several variables - ClassifICation of second order equations - Methods of solutions -The solution by separation of variables - Physical applications for the solution by separation of variables –Boundary value problem- Green function

Module Aims

- How to form partial differential equations.
- The various forms of the partial differential equation and how to solve it.
- The different methods for solving the partial differential equations.
- Recognizing of some Physical phenomena that expressed by partial differential equations and how to solve each equation.
- Recognizing the Green function and how to deal with boundary value problems.

Educational outcomes: (understanding, knowledge and mental skills and practica

- After this course supposed that the student is able to

- Recognizing the partial differential equations and difference between them and ordinary differential equations.
- Constructing partial differential equations.
- Recognizing the Lgrange methods and cushy problem.
- Recognizing the method of separation of variables.
- Recognizing some physical phenomena and the equation of every phenomena and how to solve them.

Course Content

Subject List	Weaks numbers	Teaching hours
Its Origin and classification - First-order equations and first degree.	1	4
The solution by Lagrange method – Cauchy's Problem	2	8
Linear equations of second order in several variables	1	4
Classification of second order equations	2	8
Methods of solutions-The solution by separation of variables	2	
Physical applications for the solution by separation of variables.	4	16
Boundary value problem	1	4
Green function	1	4

Textbook and reference assistance

Book's name	Author Name	Publisher	Publication year	ISBN
Principles of Partial Differential Equations	ech□Ko	Springer	2009	1441910950
Partial Differential Equations for Scientists and Engineers.	Stanley J. Farlow, Mathematics	Dover Publication, INC. New York	1993	13:978-0-486-67620-3 10:0-486-67620-x

Model (5)

Summary Course Description

Course name : Introduction to Differential Geometry	Course code :MATH473
Prerequisite : MATH241+ATH204	Teaching language: English
course level:7th	credit hours: 4 hours

Module 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.

Module Aims

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

Educational outcomes: (understanding, knowledge and mental skills and practica

- After this course supposed that the student is able to

- Having the knowledge of theory of curves in R^3-Regular curves - arc length and reparametrization –Natural parameterization- Curvature and Torsion- Serret-Frenet equation
- Having the knowledge of Existence and uniqueness theorem for space curves-Bertrand curves- Involutes and evolutes-
- Having the knowledge of Normal and geodesic curvature – Weingarten map- Principal Gaussian and mean curvatures- Geodesics- Equations of Gauss and Godazzi-Mainardi.

Course Content

Subject List	Weaks numbers	Teaching hours
Theory of curves in R^3-Regular curves - arc length and reparametrization –Natural parametrization- Serret-Frenet equations	3	12
Existence and uniqueness theorem for space curves-Bertrand curves- Involutes and evolutes	2	8

Local theory of surfaces-Simple surfaces-Coordinate transformations-Tangent vectors & tangent spaces	3	12
First and second fundamental forms– Normal and geodesic curvature	2	8
Weingarten map- Principal Gaussian and mean curvatures	2	8
Geodesics- Equations of Gauss and Godazzi-Mainardi.	2	8

Textbook and reference assistance

Book's name	Author Name	Publisher	Publication year	ISBN
First Steps in Differential Geometry: Riemannian, Contact, Simplistic	Andrew McInerney	Springer	2010	B00E3BWGZE
Differential Geometry	E□win Kr□yszig	Dover Publications,	1991	0486667219,□978048666721□

Model (5)

Summary Course Description

Course name :Introduction to Topology	Course code : MATH472
Prerequisite: MATH381	Teaching language: English
course level:7th	credit hours:3 hours

Module 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.

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

Module Aims

- Definition of the concept of topological space, open groups, home, end points, closed sets and narrow-mindedness, cluster points, isolated points, effects and neighborhoods, and relative topology rules, goats spaces ending
- Definition of the concept of interdependence and conditions Hozdorv for Linz to disperse, the definition of the concept of stacking, and Numerical stacking, continuous functions, functions open, dense groups itself, Topological Alchaclat of the topological character
- Definition of the concept of continuous functions, functions open and closed, dense groups itself, topological Alchakl of the topological character.

Educational outcomes: (understanding, knowledge and mental skills and practica

- After this course supposed that the student is able to

- The student knows the concept of topological spaces and its importance to pure mathematics.
- The student understands the concept 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 and its importance to the study of general topology.
- The student learns the concept of connectedness and the relation between connectedness and continuous functions and also the relation between connectedness and compactness and knows components and metric spaces concepts.
- The student getting used to the concept of connectedness and the relation between connectedness and continuous functions and also the relation between connectedness and compactness and knows compactness and metric spaces concepts.

Course Content

Subject List	Weaks numbers	Teaching hours
Definition of topological spaces .	1	3
open sets and interior operator– closed sets and closure operator	1	3
Limit points – cluster points – isolated points	2	6
operators and neighborhoods – relative topology- product of topological spaces	2	6
Definition of continuous functions - open and closed functions - homeomorphisms	2	6
topological property - separation axioms - Hausdroff and Lenz separation axioms-	2	6
definition of compactness – continuous	2	6

functions and compactness– compactness and separation axioms - dense sets .		
Definition of connectedness - connectedness and continuous functions - connectedness and compactness- components – metric spaces	2	6

Textbook and reference assistance

Book's name	Author Name	Publisher	Publication year	ISBN
combinatory course in topology 7ed	rk de M onguevill	Springer science+ Business Media	2011	-4419-1-1-978 4-7909
Topology (2nd Edition)	James Munches	Pearson	2000	0-13-181629-2

Model (5)

Summary Course Description

Course name : Rings and Fields	Course code :MATH443
Prerequisite : MATH342	Teaching language: English
course level:7th	credit hours :3 hours

Module 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,...,X n] 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.

Module Aims

- Building a solid mathematical knowledge on rings as an important algebraic base and tools needed in many domains of mathematics.
- Euclidian rings and the ring of polynomials over a field will be studied in details.
- The extension of fields and the finite fields is one of the most important axes of the module. They can be used in many domains as cryptography and coding theory.

Educational outcomes: (understanding, knowledge and mental skills and practica

- After this course supposed that the student is able to

- To make sure that the student is able to understand the concepts of abstract algebraic structures as rings fields and other. To make him capable to establish the differences between two structures by studying their properties.
- By adding some facts, the student will be able to extend the notion of a ring to a structure more important and having nice properties
- Modules will be shown that they can be seen as an extension of the notion of linear spaces .
- The student will be able to construct new finite fields from elementary ones.
- The student will be capable to extend the notion of divisibility seen in R[X] to any ring of the form A[X], where A is some ring.

Course Content

Subject List	Weaks numbers	Teaching hours

Rings and group of units of a ring	2	6
Group of auto orphisms of a ring. Ideals and the quotient rings	1	3
Principal rings. Prime and Maximal ideals. Field of quotients of an integral domain	2	6
Characteristic of a ring. Direct sum of rings	2	6
Modules over a ring. Euclidian rings. The ring of polynomials A[X1,X2,...,X n] over a ring A. Roots of polynomials over a Field K	3	9
Extension of fields. Simple and finite extensions of fields	2	6
Splitting fields and Algebraic Closures. Finite fields	2	6

Textbook and reference assistance

Book's name	Author Name	Publisher	Publication year	ISBN
Groups, Rings and Fields	J David A.R. Wallace	Springer	2001	3540761772-013: 9783540761778
Introduction to Finite Fields and their Applications	R. Lidl and H. Niederreiter	Cambridge University Press	199	9781139172769 9780521460941

Courses Description of eight level

Model (5)

Summary Course Description

Course name :Introduction to Function Analysis	Course code: MATH484
Prerequisite : MATH472	Teaching language: English
course level :8th	credit hours: 3 hours

Module 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

Module Aims

- Introducing the notion of the different spaces (Metric-linear-Normed - Bannach--Inner product-and Hilbert spaces)
- Clarifying the meaning of the open and closed sets in metric spaces
- Introducing the notion of the bounded linear and continuous operators and related theorems
- Solving some problems which clarify the essential properties of the above spaces
- Studying the inner product space which is a corner stone in the theory of Functional Analysis
- Introducing the bounded linear operators between Hilbert spaces – Self adjoint-normal and unitary operators

Educational outcomes: (understanding, knowledge and mental skills and practica

- After this course supposed that the student is able to

- Differentiating between different spaces
- Understanding the basic theorems concerning the above spaces
- Making sure that the concept of open and closed sets in metric spaces is well known
- Understanding the notion of bounded linear operators
- Understanding the concept of Hilbert spaces and bounded linear operators between Hilbert spaces

Course Content

Subject List	Weaks numbers	Teaching hours
A metric space	2	6
Open and closed sets	1	3
the linear space	2	6
-Banach space	2	6
the normed space	2	6
the inner product space-Hilbert space	3	9
Linear operators	2	6

Textbook and reference assistance

Book's name	Author Name	Publisher	Publication year	ISBN
Functional Analysis-Introduction to further topics in Analysis	Elias M .Stein and rami Shakarchi	Princeton University Press	2011	9780691113876
Introductory Functional Analysis with Applications	Erwin Kre□szig	John Wiley and Sons	1978	0471507318, 9780471507

				314

(Model (5

Summary Course Description

Course name: Project	Course code :MATH499
Prerequisite : 100 cridit	Teashing Langue : English
course level:	credit hours :4 h.

Module 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.

Module Aims

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

Educational outcomes: (understanding, knowledge and mental skills and practica

After this course supposed that the student is able to

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

Course Content

Teaching hours	Weaks numbers	Subject List
		Determine by the superfioser

Textbook and reference assistance

Book's name	Author Name	Publisher	Year of Publication

Determine by the superfioser			

Model (5)

Summary Course Description

Curse Name : Complex Analysis	Course code: 483 MATH
Prerequisite : 381 MATH	Teaching language: English
course level:8th	credit hours:4h.

Module 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 hyperbolic functions and logarithmic -functions. Exponential, trigonometric 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.

Module Aims

- The aim of this course is to study the topological properties of the complex numbers.
- Giving an introduction to analytic functions and complex integration and important integral formulas.
- Giving an introduction to complex integration and important integral formulas.

Educational outcomes: (understanding, knowledge and mental skills and practica

After this course supposed that the student is able to

- Distinguishing between real numbers and complex numbers
- Realizing the concept and meaning of complex numbers and how to represent and clockwork
- Expressing of the physical and natural phenomena in the form of a boat quantities
- Knowledge of analytic functions and harmonic functions
- Understanding some knowledge of the complex functions - studying the continuity and derivation complex functions
- Understanding of the foundations of complex analysis - the application of complex analysis in

solving physical problems

Course Content

Subject List	Weaks numbers	Teaching hours
Complex Numbers - Cartesian and polar representation of complex numbers- powers and roots of complex numbers-	2	8
Limits and continuity of complex functions	2	8
Analytic functions -Cauchy- Riemann equations. Harmonic functions. Exponential, trigonometric - hyperbolic functions and logarithmic functions-	3	12
Complex Integration- contour integral -Cauchy's theorem- Cauchy's integral formula.	3	12
Bounds on analytic functions -Taylor and Laurent series-Power series-	2	8
Zeros and singularities- Residue theory-	1	4
Applications to real and improper integrals.	2	8

Textbook and reference assistance

Book's name	Author Name	Publisher	Publication Year	ISBN
Complex Analysis	Joseph Back	Springer	2010	-4419-1-978 0-7288

Complex Variables and Application(8 edition)	Ruel V. Churchill & James Brown	McGraw-Hill	2008	10:0073337307 13:978-0073337302

The description of the Elective Courses

Model (5)

Summary Course Description

Course name :Topics in Applied Mathematics	Course code: MATH412
Prerequisite : MATH321	Teaching language: English
course level: Elective	credit hours:3h.

Module Description

Motion in two dimension polar coordinates –Newton's law in a plane-fundamental of fluid dynamic-continuity equation in different fluids Derivative the initial and boundary problems in MHD- Temperature equation-some special solutions for last problems by using suitable mathematical methods

Module Aims

- Derivative the motion's law in different coordinate for point and rigid body
- Studying the fundamental theory in fluid dynamic and derivative of the continuity equation for different fluids
- Studying and derivative the boundary value problem in MHD
- Studying and derivative the temperature distribution, temperature a equation and wave equation
- Studying derivative methods for Fourier series
- Studying methods solutions the boundary value problems by using the different mathematical methods

Educational outcomes: (understanding, knowledge and mental skills and practica

After this course supposed that the student is able to

- To know the fundamental studying methods the motion for different co-ordinate for the point and rod body.
- Knowing new methods for integration and using it to solve the problems the fluid dynamic and the motion in different coordinate.
- Knowing methods by using Fourier series to solve the boundary problem in temperature and MHD.
- Knowing methods to deduce the applied mathematics problems by using differential equations.
- Knowing methods for understand- ting solution of partial differential equations by using suitable mathematical methods.

Course Content

Subject List	Weaks numbers	Teaching hours
Motion in two dimension polar coordinates – Newton's law in a plane.	3	9
fundamental of fluid dynamic-continuity equation in different fluids.	4	12
Derivative the initial and boundary problems in MHD- Temperature equation	3	9
some special solutions for last problems by	4	12

using suitable mathematical methods		

Textbook and reference assistance

Book's name	Author Name	Publisher	Publication Year	ISBN
Introduction to Theoretical and Computational fluid dynamics	C. Pozrikidis	Oxford University	2011	10: 0199752079 13: 978-72□99752□0
Mathematical Methods in the Physical Sciences	Mary L. Boas	Johan Wiely, Sons , Inc.	1995	0-471-19826-4 13:978-0-471-19826-0

Model (5)

Summary Course Description

Course name: Real Analysis 2	Course code :MATH482
Prerequisite : MATH381	Teaching language: English
course level:Elective	credit hours:3h.

Module Description

Definition of Riemann integral- Dario theorem and Riemann sums - Properties and the principle theorem in calculus.Sequance 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.

Module Aims

The aim of this course :

- Studding Dario theorem a, Riemann sums properties and the principle theorem in calculus.
- Studding a sequence , series of functions, poi twice convergence, uniform convergence, algebra and sigma algebra.
- Studding finite additive and countable additive- Main extension theorem and outer measure- measurable sets.
- Studding a measure , Lebesgue measure and its properties, simple functions, measurable functions, Lebesgue integral, theorems of convergence, and the relation between Lebesgue and Riemann integral

Educational outcomes: (understanding, knowledge and mental skills and practica

After this course supposed that the student is able to

- Understanding of Dario theorem a, Riemann sums properties and the principle theorem in calculus.
- Understanding a sequence , series of functions, poi twice convergence, uniform convergence, algebra and sigma algebra.
- Have knowledge of finite additive and countable additive- Main extension theorem and outer measure- measurable sets.
- Knowing on the concept of a measure , Lebesgue measure and its properties, simple functions, measurable functions, Lebesgue integral, theorems of convergence, and the relation between Lebesgue and Riemann integral

Course Content

Subject List	Weaks numbers	Teaching hours
Definition of Riemann integral- Dario theorem and Riemann sums	2	6
Properties and the principle theorem in calculus.Sequance Series of functions	2	6
Poi twice convergence and uniform	2	6

convergence- Algebra and (sigma algebra)		
Finite additive and countable additive	2	6
Main extension theorem and outer measure	2	6
Measurable sets - Measure - Lebesgue measure and its properties	2	6
Simple functions- Measurable functions	1	3
Lebesgue integral- Theorems of convergence- The relation between Lebesgue and Riemann integral	2	6

Textbook and reference assistance

Book's name	Author Name	Publisher	Publication Year	ISBN
Introduction to Real Analysis	William F. Trench Hyperlinked	Pearson Education	2012	0-13-045786-8
Real Analysis ((4th Edition	H. Royden, P. Fitzpatrick	Macmillan Publishing Co. , Inc. New York	2010	10:01314374x 13:978□013143 7470

Model (5)

Summary Course Description

Course name: Number Theory	Course code :MATH344
Prerequisite : MATH231	Teaching language: English
course level:Elective	credit hours:2h.

Module 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..

Module Aims

- This course aims to give students the basic concepts and properties of the integers and reliable in the study of abstract algebraic concepts.

Educational outcomes: (understanding, knowledge and mental skills and practica

After this course supposed that the student is able to

- 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

Course Content

Subject List	Weaks numbers	Teaching hours
First and second principle of Mathematical Induction-	1	2
Divisibility- Euclidean Algorithm	1	2
Primary Numbers and their properties	2	4
Linear Diophantine Equations- Congruence's and their properties- linear Congruence's	2	4
The Chinese Remainder Theorem	2	4
Well–ordering principle	1	2
Fermat’s little theorem- Euler’s theorem- Wilson’s theorem	2	4
Pythagorean triples	1	2
- Arithmetic functions	2	4

Textbook and reference assistance

Book's name	Author Name	Publisher	Publication Yeare	ISBN
Elementary number theory and its Applications 6th Edition	Kenneth H.Rosen	Addison-Wesley publishing company. New York	2010	978-□13 0321500311
Elementary Number Theory	Gareth A. Jones and Josephine M. Jones	Springer	1998	3-540-76197-7

Model (5)

Summary Course Description

Course name : Financial Mathematics	Course code :MATH 311
Prerequisite : MATH202	:Teashing Langue : English
course level:Elective	credit hours :2 h

Module Description

Pricing – Tax – Insurance – Benefits – Annual Payments – Amortization – Investment

Module Aims

- Introduce students to math and use of financial management in banks and

business and trade

Educational outcomes: (understanding, knowledge and mental skills and practica

After this course supposed that the student is able to

- 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

Course Content

Subject List	Weaks numbers	Teaching hours
Introduction (financial market)	2	4
Options	2	4
Ito's Lemma	2	4
Option pricing	2	4
Delta hedging	2	4
American option	2	4
Binomial method	2	4

Textbook and reference assistance

Book's name	Author	Publisher	Publui	ISBN

	Name		cation Year	
Pacification Of Options Futures and Other Derivatives (With CD) 7th Edition	John C Hull, Sankarshan Basu	Pearson	2009	13:9788131723586 10:8131723585

Model (5)

Summary Course Description

Course name : Optimization Technique	Course code : MATH454
Prerequisite: MATH352	Teaching language: English
course level:Elective	credit hours:3h.

Module 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.

Module Aims

- This course aims to give students the basic concepts of optimization and different ways to treat optimization restricted and unrestricted and the

possibility of the practical application of these concepts.

Educational outcomes: (understanding, knowledge and mental skills and practica

After this course supposed that the student is able to

- Recognizing the basic concepts of optimization functions convex and concave functions and the quadratic formulas.
- Solving the optimization of non-linear programming in one variable or multiple variables and how to use the Hessian matrix for it.
- Recognizing on methods for solving the optimization problem of non-linear programming with constrained equations (substitution direct method - Lagrange multiplier method
- Recognizing the methods of solving optimization problem with inequality constraints
- Recognizing the Kuhn-Tucker and Fritz –John conditions for solving the optimization problem

Course Content

Subject List	Weaks numbers	Teaching hours
The concept of the optimality- convex and concave functios – quadraic formula	3	9
The optimality of problems in singal and sevral variables without constraints – Hessian Matrix	2	6
The optimality of non-linear problems with equality constraints	1	3
Substituation method- Lagrange multipliers method	2	6
The optimality of non-linear problems with inequality constraints	1	3
Fritz-John and Kuhn-Tucker optimality conditions	3	9
The quadratic formula for the optimality problem	2	6

Textbook and reference assistance

Book's name	Author Name	Publisher	Publication Year	ISBN
Nonlinear Programming: Theory and Algorithms [Hardcover	Mokhtar S. Bazaraa	John Wiley and Sons Ltd	2013	10-0-471-48600-0 13:978-0471
Introduction to the Theory of Nonlinear Optimization	Jahn, Johannes	Springer	2007	978-3-540-49379-2

Model (5)

Summary Course Description

Course name: Calculus of variation	Course code :MATH405
Prerequisite : MATH321	Teaching language: English
course level:Elecative	credit hours :3h.

Module 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

Module Aims

- Having the elementary knowledge of extremum for function of several variables
- Having the knowledge of Euler-Lagrange equations and its applications
- Having the knowledge of the generalizations and special cases of Euler-Lagrange equations

- Having a knowledge of Hamiltonian equations and its applications

Educational outcomes: (understanding, knowledge and mental skills and practica

After this course supposed that the student is able to

- Solving some extremum problems of functions of several variables
- Deriving of Euler-Lagrange equation
- Deriving of the generalizations and special cases of Euler equation
- Deriving of Hamiltonian equations
- Having the knowledge of some variation calculus applications
- making some search in Libraries and internet

Course Content

Subject List	Weaks numbers	Teaching hours
Extremum of a function of many variables (absolute and conditional extremum).	3	9
The Functional - The variation of a functional and its properties, The elementary problem in the calculus of variations.	3	9
Subject List	Weaks numbers	Teaching hours
Euler's equation- Generalizations of the elementary problem of the calculus of variations, Invariance of Euler's equation	3	9
- Field of Extremals, Sufficient conditions for the extremum of a functional.	2	6

conditional extremum- moving boundary problems,	1	3
The Hamilton-Jacobi theory- the variation principles of Mechanics, Some applications.	2	6

Textbook and reference assistance

Book's name	Author Name	Publisher	Publication Year	ISBN
An Introduction to the Calculus of Variations	Charles Fox	Dover Publications	2010	10: 0486654990 13: 978-0486654997
Introduction to the Calculus of Variations	Bernard Dacorogna	Imperial College Press; 2 edition	2008	10: 1848163347 -13: 978-1848163348

Model (5)

Summary Course Description

Course name: Fourier Analysis	Course code:MATH485
Prerequisite : (MATH483 + MATH423) Simultaneously	Teaching language: English
course level:Elective	credit hours:2h.

Module Description

Topological vector spaces: Definitions, semi- norms and their induced topologies- criteria forcontinuity of semi-norms and linear maps- Schwartz space $S(R^n)$-continuity of $S(R^n) \to R^n$ Tempered distributions: the space $S'(R^n)$- differentiation of distributions and multiplication by functions of slow increase - examples. Fourier analysis : Fourier transform on $S(R^n)$- main properties - Fourier inversion theorem- Plancheral formula- Fourier transform on $S'(R^n)$- properties -weak topology of $S'(R^n)$ - Fourier series in $S'(R^n)$- convolutions and continuity properties - compatibility - Riemann-Lebesgue lemma - the space

$C_0(R^n)$. Density theorems : the space $C_o^\infty(R^n)$ - density of $C_o^\infty(R^n)$ in $S(R^n)$ - the space BC^r - approximations to δ_0 - approximations in BC^r.Sobolev spaces : definition of $H^k(R^n)$- Fourier transform when $k \in R$- properties - distributional derivative - duality of H^{-k} with H^k Sobolev embedding theorem for $H^k(R^n)$.

Module Aims

- Provide key concepts in Fourier analysis and the theory of distribution so that the student by knowing the advanced concepts analysis application and utilization of important analytical techniques in the analysis of the signal and in partial differential equations.
- Student learns some new concepts, some different spaces and some different types of convergence of mathematics.

Educational outcomes: (understanding, knowledge and mental skills and practica

After this course supposed that the student is able to

- Providing key concepts in Fourier analysis and the theory of distribution so that the student by knowing the advanced concepts analysis application and utilization of important analytical techniques in the analysis of the signal and in partial differential equations.
- Students learn some new concepts, some different spaces and some different types of convergence of mathematics.

Course Content

Subject List	Weaks numbers	Teaching hours
Topological vector spaces: Definitions, semi- norms and their induced topologies- criteria forcontinuity of semi-norms and linear maps	3	6
Schwartz space $S(R^n)$-continuity of $S(R^n) \to R^n$	2	4

Tempered distributions: the space $S'(R^n)$		
differentiation of distributions and multiplication by functions of slow increase - examples. Fourier analysis : Fourier transform on $S(R^n)$ - main properties - Fourier inversion theorem–	2	4
Plancheral formula- Fourier transform on $S'(R^n)$ - properties -weak topology of $S'(R^n)$ - Fourier series in $S'(R^n)$ - convolutions and continuity properties - compatibility - Riemann-Lebesgue lemma	2	4
the space $C_0(R^n)$. Density theorems : the space $C_o^\infty(R^n)$ - density of $C_o^\infty(R^n)$ in $S(R^n)$ - the space BC^r - approximations to δ_0	2	4
approximations in BC^r.Sobolev spaces : definition of $H^k(R^n)$- Fourier transform when $k \in R$ -	2	4
properties - distributional derivative - duality of H^{-k} with H^k Sobolev embedding theorem for $H^k(R^n)$.	1	2

Textbook and reference assistance

Book's name	Author Name	Publisher	Publication Year	ISBN
Fourier Analysis	T. W. Körner	Cambridge University Press	1989	10:0521389917 13: 978-0521389914
Fourier Analysis and Its Applications	Gerald B. Folland	American Mathematical Society	2009	10: 0821847902 13: 978-0821847909

Model (5)

Summary Course Description

Course name: Discrete Mathematics	Course code:MATH334
Prerequisite: MATH231	Teaching language: English
course level:elective	credit hours :3h.

Module 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.

Module Aims

This course aims to give a direct relationship between the mathematics field and its applications in computer science.

Educational outcomes: (understanding, knowledge and mental skills and practica

After this course supposed that the student is able to

- Recognize on sentential calculus- Logical, arguments and methods of Proof.
- Recognize on relations, equivalence Relations and order relations.
- Recognize on Boolean Algebras
- Recognize on Logic Circuit- Graph Theory- Connected Graph
- Recognize on Isomorphic Graph- Planar Graph- Trees.

Course Content

Subject List	Weaks numbers	Teaching hours
Sentential Calculus- Logical Equivalence	3	9
Arguments- Methods of Proof	3	9
-Relations- Equivalence Relations- Order Relations	2	6
Boolean Algebras – Logic Circuit	3	9
Graph Theory- Connected Graph-Isomorphic Graph- Planar Graph- Trees	3	9

Textbook and reference assistance

Book's name	Author Name	Publisher	Publication Year	ISBN
Discrete Mathematics and Its Applications 5 edition	Kenneth H. Rosen	McGraw-Hill Science/Engineering/ Math;	2003	10: 0072930330 13: 978-0072930337
Discrete Mathematics, 7th Edition	Richard Johnsonbaugh	Pearson	2007	10: 0131593188 -13: 978-0131593183

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del (5)

Summary Course Description

Course name:Graph theory	Course code :MATH332
Prerequisite231 : MATH	Teaching language: English
course level:Elective	credit hours:2h.

Module 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 problems

Module Aims

Our aims in this course are two folds. First, to discuss some of the major results of graph theory, and to provide an introduction to the language, methods and terminology of the subject. Second, to emphasize various approaches (algorithmic, probabilistic, etc) that have proved fruitful in modern graph theory: these modes of thinking about the subject have also proved successful in other areas of mathematics, and we hope that students will find the techniques learnt in this course to be useful in other areas of mathematics such as computer science .(studies networks), bioinformatics, statistical physics, chemistry, sociology, etc. 2-More precisely In this module we will focus on results from structural graph theory and its applications in related areas, in particular, in algorithm design and number theory. The module should provide an overview of main techniques with their potential applications. We will focus, in particular, our attention on networks and give real world examples of networks include transport networks such as the Gautrain rail system, electric networks, social networks and the internet

Educational outcomes: (understanding, knowledge and mental skills and practica

After this course supposed that the student is able to

- Acquisition of the principal concepts of the theory of graphs.
- To be able to transcript the life problems and then representing in graph theory in order to apply the acquired knowledge to solve them
- The student discovers the importance of Mathematics in solving problems of life. The student will also discover that the theory of graphs can be useful for

any other branch of sciences.

Course Content

Subject List	Weaks numbers	Teaching hours
Introduction to graph theory,Basic concepts (complete graphs- sub graphs- spanning sub graphs n-partite graphs complete bipartite graphs – complementary graphs)-	4	8
Operations on graphs- Sequences and graphs- Matrices and graphs-	3	6
Paths, circuits, cycles and connected graphs-	2	4
Eulerian and Hamiltonian graphs	1	2
Trees- minimal spanning trees	1	2
Planar and non-planar graphs- Graph	1	2
Graph coloring (complete graphs- Trees – Cubes – partite graphs	1	2
Applications- shortest path problems	1	2

Textbook and reference assistance

Book's name	Author Name	Publisher	Publication Year	ISBN
Introduction to Graph Theory ;2nd edition	Richard J. Trudeau	Dover Publications;	1994	10: 0486678709 13: 978-0486678702
Introduction to	Douglas B.	Pearson	2000	10: 0130144002

Graph Theory (2nd Edition)	West			13 978-0130144003

Model (5)

Summary Course Description

Course name: Linear Algebra 2	Course code :MATH345
Prerequisite : MATH241	Teashing Langue : English
course leve:Elective	credit hours :2h.

Module 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}

Module Aims

- Introducing students to some of the advanced concepts in linear algebra with some applications
- Matrices The algebraic operations, determinants, the use of these concepts to solve systems of linear equations.
- Giving a survey of eignvalues and Eigen vectors of square matrix and its properties and applications
- Applied concepts of linear algebra to solve the mathematics, statistics, engineering and social sciences problems

Educational outcomes: (understanding, knowledge and mental skills and practica

After this course supposed that the student is able to

- Identifying Kelly Hamilton Theory.
- Understanding the Eigen values and Eigen vectors.
- Making a connection between linear algebra concepts and other branches of mathematics.
- Solving practical problems.
- Solving a system of linear equations in different methods.
- Having knowledge of using proofs techniques.

Course Content

Subject List	Weaks numbers	Teaching hours
Triangular matrix- - Danvour analysis-	2	4
Caley-Hamilton theorem	2	4
- Characteristic polynomials-Eigen values &Eigen vectors	2	4
Danvour analysis-	1	2
The Jordan form- Function of a matrix-	1	2
Properties of e^{A}	2	4
Solve asystem of linear differential equations with the exponential e^{At}	2	4
Linear differential equations with constant coefficients and the exponential e^{At}	2	4

Textbook and reference assistance

Book's name	Author Name	Publisher	Publication Year	ISBN
Linear Algebra	Jim Hefferon	Virginia Commonwealth University Mathematics	2009	10: 0982406215 13: 978-0982406212
Elementary	Howard	John Wiley & Sons; 8th	2000	10:

Linear Algebra	Anton	Edition		0471170550 13: 978-0471170556

Model (5)

Summary Course Description

Course name: Mathematical logic	Course code :MATH433
Prerequisite : MATH231	Teashing Langue:English
course level:Elective	credit hours :2h.

Module 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.

Module Aims

- 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.

Educational outcomes: (understanding, knowledge and mental skills and practica

After this course supposed that the student is able to

- Studying and learning some of the concepts in mathematical logic and its applications.
- The student uses the concepts of mathematical logic and methods of proof in the study of modern mathematics and related courses

Course Content

Subject List	Weaks numbers	Teaching hours
Propositional calculus	2	4
The deduction theorem for propositional calculus	2	4
Completeness and consistency of propositional calculus	2	4

Predicate calculus	2	4
First-order theorems-	2	4
Consistency of first-order predicate calculus	3	6
Completeness theorem for predicate logic	2	4

Textbook and reference assistance

Book's name	Author Name	Publisher	Publication year	ISBN
A Mathematical Introduction to Logic, Second Edition	Herbert Enderton , Herbert B. Enderton	academic Press	2001	10: 0122384520 13: 978-0122384523
Mathematical Logic	Stephen Cole Kleene	Dover Publications	2002	10: 0486425339 13: 978-0486425337

Model (5)

Summary Course Description

Course name Data Analysis	Course code :STAT404
Prerequisite : STAT302	Teaching language: English
course level:Elective	credit hours:2h.

Module 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 ρ - SPSS or MINITAB Statistics Software Packages

Module Aims

- Understanding the statistic and the parameter- deducing the distribution of the sample mean. Using t- distribution for testing hypotheses and confidence intervals.
- Constructing confidence intervals on the mean of a normal distribution, using either the normal distribution or the t distribution
- Deducing and understanding the distribution of the sample proportion.
- Testing hypothesis about correlation coefficient.
- Understanding how the analysis of variance is used to analyze the data from these experiments
- Use SPSS or MINTAB Statistics Software Packages

Educational outcomes: (understanding, knowledge and mental skills and practica

After this course supposed that the student is able to

- Deducing the distribution of the sample mean.
- Constructing confidence intervals on the mean
- Understanding meaning of statistical testing hypotheses
- Interpreting the analysis of variance
- Using SPSS or MINTAB Statistics Software Packages

Course Content

Subject List	Weaks numbers	Teaching hours
Review, random experiment , random variable	1	2
Random sampling and its methods, normal distribution	1	2
t- distribution - Distribution of the sample mean	2	4
sampling from two populations	1	2
testing hypothesis about the population mean	2	4

The analysis of variance	2	4
ANOVA - Goodness of fit – chi- square test, - fixed and random factors.	1	2
testing hypothesis about correlation coefficient ρ .	1	2
SPSS or MINITAB Statistics Software Packages	3	6

Textbook and reference assistance

Book's name	Author Name	Publisher	Publication Year	ISBN
Applied Statistics and Probability for Engineers	Douglas C. Montgomery , George C. Runger	Wiley; 4 edition	2006	10: 0471745898 13: 978-0471745891
Statistical Data Analysis	Glen Cowan	Oxford University ress, USA	1998	10: 0198501552 13: 978-0198501558

Model (5)

Summary Course Description

Course name :Inventory Models	Course code 303 :STAT
Prerequisite : STAT + 352MATH302	Teaching language: English
course level:Elective	credit hours:2

Module 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

Module Aims

Understanding the importance of inventory control and ABC analysis.
- Using the Economic order quantity (EOQ) to determine how much to order.
- Computing the reorder point (ROP) in determining when to order more inventory.
- Understanding the use of safety stock with known and unknown stock out costs.
- Describing the probabilistic inventory models.
- Solving constrained inventory problems.

Educational outcomes: (understanding, knowledge and mental skills and practica

After this course supposed that the student is able to

- Knowing the difference between the deterministic and probabilistic inventory systems
- Using the Economic order quantity (EOQ) to determine how much to order.
- Understanding the use of safety stock with known and unknown stock out costs.
- Describing the probabilistic inventory models
- Finding the optimal solution for constrained inventory system

Course Content

Subject List	Weaks numbers	Teaching hours
General introduction- Importance of Inventory Control – deterministic models- Economic order quantity (EOQ) - Reorder Point (ROP) -	3	6
inventory models for single item and multiple items	2	4
- Some dynamic inventory models – EOQ Without the Instantaneous Receipt Assumption. Quantity Discount Models- Use of Safety Stock. Dependent Demand..	2	4
Some probabilistic inventory models -	1	2
Dynamic optimization of inventory scheduling. – Lead-time demand Normally distributed. - Other distributions for the Lead-time demand; EOQ as a special case.	1	2
Constrained Inventory models	2	4
Optimal solution using geometric programming and lagrangian multiplier techniques	3	6

Textbook and reference assistance

Book's name	Author Name	Publisher	Publication	ISBN

			Year	
Principles of Inventory and Materials Management ((4th Edition	Richard J. Tersine	Prentice Hall	1993	10: 0134578880 13: 978-0134578880
Operations Research: An Introduction (9th Edition)	Hamdy A. Taha	Prentice Hall	2010	10: 013255593X 13: 978-0132555937

Model (5)

Summary Course Description

Course name : Mathematics History	Course codeMATH335:
Prerequisite : MATH231	Teashing Langue : English
course level:Elective	credit hours :2h.

Module Description

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

Module Aims

the mathematics and its various Definition to the student the roots of applications in algebra, geometry and recognizing the achievements of Arabs .and Muslims scholars in this field

Educational outcomes: (understanding, knowledge and mental skills and practica

After this course supposed that the student is able to

- Knowing the striking similarity between the ancient peoples Almeria, Babylonian, Greek, Chinese, Islamic and European –
- To know some modern theories in the mathematical sciences have roots in the depths of history therefore be more established and stable in mind
- Studying the history of many mathematical concepts different mathematical algorithms in arithmetic and algebra, trigonometry , planar and analytic geometry and calculus
- knowing some famous mathematicians and the role of Arab and Muslim scholars in the development of mathematics.

Course Content

Subject List	Weaks numbers	Teaching hours
The emergence and development of some of the concepts ,facts and mathematical algorithms in the account through ancient civilizations, Egyptian, Babylonian, Greek, Chinese, Islamic and European	3	6
The emergence and development of some of the concepts ,facts and mathematical algorithms in algebra and trigonometry through ancient civilizations, Egyptian, Babylonian, Greek, Chinese, Islamic and European	3	6
The emergence and development of some of the concepts ,facts and mathematical algorithms in solid and analytic geometry through ancient civilizations, Egyptian, Babylonian, Greek, Chinese, Islamic and European	3	6
The emergence and development of some of the concepts ,facts	3	6

and mathematical algorithms in calculus through ancient civilizations, Egyptian, Babylonian, Greek, Chinese, Islamic and European		
Devlopment of some of the accounts and open problems and attempts to solve them	2	4

Textbook and reference assistance

Book's name	Author Name	Publisher	Publication year	ISBN
A History of Mathematics, Second Edition	Carl B. Boyer, Uta C.Merzbach , Isaac Asimov	Wiley	1991	10: 0471543977 13: 978-0471543978
A Concise History of Mathematics: Fourth Revised Edition	Dirk J. Struik	Dover Publications	1987	10:0486602559 13:978-0486602554

Model (5)

Summary Course Description

Course name : Numerical Analysis2	Course code 455 :MATH
Prerequisite : MATH351	Teashing Langue :English
course level:Elective	credit hours:3h

Module 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.

Module Aims

- Learning the basics of mathematical calculators and recycling Errors
- Deriving some numerical methods, error analysis and studying the stability and convergence.
- Studying some numerical methods to solve boundary value problems (finite difference methods for issues of linear and non-linear assembly and method of error analysis and convergence study.(
- Writing the implementation of algorithms to solve some issues using numerical methods by computer.

Educational outcomes: (understanding, knowledge and mental skills and practica

After this course supposed that the student is able to

- Learning numerical methods for solving ordinary differential equations.
- Learning methods to solve numerical threshold values.
- Learning numerical methods for solving partial differential equations using finite difference method.
- Learning numerical methods for solving partial differential equations using finite element method.

Course Content

Subject List	Weaks numbers	Teaching hours
Advanced Numerical methods with computer	2	6

applications-		
approximation theory – polynomial approximations- Chebyshev polynomials- trigonometric polynomials-rational function approximation - least square problems	4	12
Direct methods for large and sparse linear and nonlinear systems	2	6
backward error analysis	1	3
Numerical methods for solving ordinary differential equations.	2	6
solving partial differential equations by finite differences and finite elements methods	3	9

Textbook and reference assistance

Book's name	Author Name	Publisher	Publication Year	ISBN
Numerical Methods Fourth Edition	J. Douglas Faires, Richard L. Burden	Cengage Learning	2012	،0495114766 9780495114765
Numerical Methods for Engineers,	Steven Chapra , Raymond Canale	McGraw-Hill Science/Engineering/ Math	2009	10: 0073401064 13: 978-0073401065

Sixth: The implementation of the program requirements

1 - Human potential

What is the number of faculty members with the required teaching at the beginning of the program: (If the professor is available from other programs within the College please mention it in the item available or not)

Major Specialization	Minor Specialization	Acadimic dgree	The required number	Available number of other programs within the college
Mathematics	Pure Mathematics	Professor	3	0
Mathematics	Pure Mathematics	Associate Professor	3	0
Mathematics	Pure Mathematics	Assistant Professor	12	0
Mathematics	Applied Mathematics	Professor	1	0
Mathematics	Mathematical Statistics	Assistant Professor	2	0

What is the required number of lecturers with teaching at the beginning of the department : (if the lecturer is available from other programs within the College please mention it in the item available or not)

Major Specialization	Minor Specialization	The required number	Available number of other programs within the college
Mathematics	Pure Mathematics	4	0
Mathematics	Mathematical Statistics	1	0
Mathematics	Applied Mathematics	1	0

What is the required number of teaching assistants with teaching at the beginning of the department: (if the emonstrator is available from other programs within the College please mention it in the item available or not)

Major Specialization	Minor Specialization	The required number	Available number of other programs within the college
Mathemati	Pure Mathematics	4	0

cs			
Mathematics	Mathematical Statistics	1	0

What is the number of technicians required with the beginning of the teaching department : (if artwork is available from other programs within the College please mention it in the item available or not)

Major Specialization	Minor Specialization	The required number	Available number of other programs within the college
Laboratory Technician	Computer technician	2	1

1-Material resources

What is the number of classrooms needed for the department:
(Please describe and explain the information about the required classrooms within the submitted studing)

The total number	9	Currently the number required	3

What is the number of labs and workshops for the department:
(Please describe and explain the information about the required laboratories and workshops within the study submitted with the application)

The total number	3	The total cost	R.S	Currently the number required	2	Currently Cost	R.S

What are the offices of a number of faculty members, lecturers and teaching assistants are required:

The total number	24	Currently the number required	12

What is the number of offices for management and services, meetings and conferences:

Management Offices	2	Student Services	----	conferences:	----	meetings	1

Please specify the administration offices and the services required: (Head of Department, Associate, secretary, library, ... etc.)
Office of the Head of the Department, (1) Associate, (1) secretary (1), library (1)

Seventh: tools and sources of teaching and learning

1-Teaching and learning tools

What are the learning tools necessary to implement the program: (Please select the tool and customized)

Classic tools

Classrooms - books and references process - Computer Lab - Display devices

Audio tools

No

Optical Instruments:

No

Electronic tools and programs: smart boards - Internet - ready-made programs - such as maple-mat lab

2-Sources of teaching and learning

What are the sources of learning are proposed: (Select the source type and detailed)

Journals and reviews

http:// www.sciencedirect.com

http :// www.springer.com

/http:// www.siam.org-

/htt://mathforum.org/advanced/numerICal.htm

Specialized websites

http:// www.gigabedia.org

http://ww.cmi.univ-mrs.fr

/http://ww.arxiv.org

/http://www.ims.ac.uk

http://www.ams.org

Other educational resources (courses, workshops, and training): A workshop attended by students weekly in the department

What is the ratio of textbooks that are currently available in the library of the courses that will

be taught in the program: (List compiled)

What is the ratio of Journals that are currently available and has a relationship to the program: (70%)

What is the ratio of scientific resources and support that are currently available in the library and will be used to teach courses in the program: (e-library)

Determine a major book and at least one for each course in the plan and the supporters of two books and fill out the table below

Text books

Course name	Book's name	Author	Publishing House	ISBN	N. copies	Available Copies
STAT 201 Statistics and probability(1)	Applied Statistics and Probability for Engineers.7 edition	D.C.Montgomey unger& G. C.	John Wiley & Sons. (2011)	-0- 13:978 -05304-470 1	5	0
	A Modern Introduction to Probability and Statistics	F. M. Dekking Cornelis Kraaikamp Hendrik Paul Lopuhaa¨Ludolf Erwin Meester	Springer-Verlag London Limited (2005)	13: 978-1-85233-896-1	5	0
MATH 201 Calculus 1	Calculus	Smith/Minton	Mc GrawHill (2012)	978007131 6576	5	0
	Single Variable Calculus: Early Transcendentals seventh edition	James Stewart	Cengage learning (2011)	13:978 -0-538-49857-8	5	0
MATH271 Introduction to geometry	Algebra and Trigonometry with Analytic Geometry	Earl W. Swokowski , Jeffery A.Cole	Cengage Learning (2011)	13: 978-084006852 1	5	0
	Calculus and Analytic Geometry (9th Edition)	George B. Thomas; Ross L. Finney	Addison Wesley (1995)	13: 978-020153174 9	5	0
MATH231 Mathematics Basis	Discrete Mathematics and Its Applications	H. Kenneth Rosen	WCB/Mc Graw-Hill(2012)	-13:978: 007289905 4	5	0
	A Book of Abstract Algebra: Second Edition	J. Mathos, R. Campanha	McGraw Hill (1990)	-13:978-0 486-47417-5	5	0

Course name	Book's name	Author	Publishing House	ISBN	N. copies	Available Copies
MATH202 Calculus 2	Calculus	Smith/ Minton	Mc GrawHill (2012)	9780071316576	5	0
	Calculus and Analytic Geometry (9th Edition)	George B. Thomas; Ross L. Finney	Addison Wesley (1995)	13: 978-0201531749	5	0
MATH203 Calculus in several variables	Calculus of one and several Variables, Ninth Edition	Salas,Hille, Etgen	John Wiley &Sons,New York(2003)	-04717-23120	5	0
	Multivariable Calculus7th edition	James Stewart	Brooks Cole(2011)	-978 0538497879	5	0
MATH204 Vectors Calculus	Vector Calculus	Susan Jane Colley	Pearson (2011)	0321780655	5	0
	Calculus□Vector	MIChael Corral	Schoolcraft College(2008)	B006DTH4MY	5	0
MATH241 Linear Algebra 1	Introduction to Linear Algebra,4th Edition	Gilbert Strang	Wellesley-Cambridge Press and SIAM(2009)	International Edition	5	0
	Linear algebra	schaum Seymour Lipschutz, Marc Lipson	Mc Graw Hill(2012)	13: 978-0071794565	5	0
MATH321 Introduction to Differential Equation	Ordinary Differential Equations	William A Adkins, Mark G Davidson	Springer (2012)	:13 9781461436171	5	0
	Schaum's Outline of Differential Equations, 3rd edition	Richard Bronson ,Gabriel Costa	McGraw-Hill (1994)	13: 978-0071456876	5	0
MATH351 Numerical Analysis 1	Numerical Analysis. 9th	R.L. Burden and J.D. Faires	Edition Brooks / cole(2011)	-0-978 :136-73563-538	5	0
	An Introduction to Numerical Analysis	Endre Süli, David F. Mayers	Cambridge (2003)	0521810264	5	0

Course name	Book's name	Author	Publishing House	ISBN	N. copies	Available Copies
MATH352 Linear Ptrogramming	Linear Programming: Methods and Applications	Saul L,Gass	Dover publication (2013)	-456-0 z64-x43	5	0
	Introduction to Operations Research	Frederick S. Hillier; Gerald J. Lieberman	Introduction to Operations Research (2009)	:13 9780077298340	5	0
MATH353 Mathematical application in computer	Mathematical a system for doing mathematics by computer5th	Wolfram, Stephen	Addison-Wesley Publishing Company,Inc (2008)	0-201-4-51502	5	0
	MATLAB PROGRAMMING	Y. Kirani Singh,B. B. Chsudhuri	Prentice-Hall of India(2007)	978-81-203-3081-8	5	0
MATH322 Mathematical Methods	Second Order Differential Equations: Special Functions and Their ClassifICation	Gerhard Kristensson	Springer (2010)	13: 978-0486656496	5	0
	Fourier Analysis and its Applications	Geral B. F Fourier Folland	Pacific Grove (Latest edition)	-978 0821847909	5	0
MATH 342 Group Theory	Group Theory	W.R. Scott	Dover(2010)	13: 978048665778	5	0
	Introduction to Group Theory	Oleg Bogopolski	TU Dortmund, Germany (2008)	978-3-03719-041-8	5	0

Course name	Book's name	Author	Publishing House	ISBN	N. copies	Available Copies
STAT302 Statistics and probability 2	WCS)Applied Statistics and Probability for Engineers, 4th Edition Binder Ready Version	Douglas C. Montgomery, George C Run□er	John Wiley & Sons Canada(2007)	9780470729441	5	0
	Probability & Statistics for Engineers & Scientists(9th edition)	Ronald E. W. Raymond H. M.Sharon L. M.Keying Ye	Prentice Hall (2011)	1-62911-321-0-978	5	0
MATH423 Partial Differential Equations	es of □Princip Partial Differential Equations	Komech	Springer (2009)	1441910950	5	0
	Partial Differential Equations for Scientists and Engineers,	Stanley J. Farlow, Mathematics	Dover Publication, INC. New York (1993)	13:978-0-486-67620-3 10:0-486-67620-x	5	0
MATH381 Mathematical Analysis 1	Mathematical Analysis	Elias Zakon	Trillia group(2011)	9781931705502	5	0
	Introduction to Real Analysis	R .Bartle and D .Sherbert	John- and □Wiley Sons(2011)	978-0-471-43331-6	5	0
MATH443 Rings and Fields	Groups, Rings and Fields	J David A.R. Wallace	Springer(2001)	13: 97835407617(78	5	0
	Introduction to Finite Fields and their Applications	R. Lidl and H. Niederreiter	Cambridge University Press(1994)	9780521460941	5	0
MATH472 Introduction to Topology	combinatory course in topology 7ed	Mark de longueville	Springer science+ Business Media(2011)	978-1-4419-7910-0	5	0
	Topology (2nd Edition)	James Munches	Pearson(200)	0-13-181629-2	5	0

Course name	Book's name	Author	Publishing House	ISBN	N. copies	Available Copies
MATH473 Introduction to Differential Geometry	First Steps in Differential Geometry: Riemannian, Contact, Simplistic	Andrew McInerney	Springer(2010)	B00E3BWGZE	5	0
	Differential Geometry	Erwin Kreyszig	Dover Publications, (1993)	0486667219, 9780486667218	5	0
MATH483 Complex Analysis	Complex Analysis	Joseph Back	Springer (2010)	978-1-4419-7288-0	5	0
	Complex Variables and Application(8 edition)	Ruel V. Churchill & James Brown	McGraw-Hill(2008)	10:0073337307 13:978-0073337302	5	0
MATH484 Introduction to functional analysis	Functional Analysis-Introduction to further topics in Analysis	Elias M .Stein and rami Shakarchi	Princeton University Press(2011)	9780691113876	5	0
	Introductory Functional Analysis with Applications	Erwin Kreyszig	John Wiley and Sons(1978)	0471507318, 9780471507314	5	0
MATH344 Number Theory	Elementary number theory and its Applications 6th Edition	H.Rosen Kenneth	Addison-Wesley publishing company. New York(2010)	13:978-0321500311	5	0
	Elementary Number Theory	Gareth A. Jones and Josephine M. Jones	Springer(1998)	3-540-76197-7	5	0

Course name	Book's name	Author	Publishing House	ISBN	N. copies	Available Copies
MATH455 Real Analysis	Numerical Methods Fourth Edition	J. Douglas Faires, Richard L. Burden	Cengage Learning(2012)	9780495114765	5	0
	Numerical Methods for Engineers,	Steven Chapra , Raymond Canale	McGraw-Hill Science/Engineering/Math (2009)	13: 978-0073401065	5	0
MATH332 Graph Theory	Introduction to Graph Theory ;2nd edition	Richard J. Trudeau	Dover Publications ; (1994)	13: 978- 486678702	5	0
	Introduction to Graph Theory (2nd Edition)	Douglas B. West	Pearson (2000)	13: 978-0130144003	5	0
MATH345 Linear Algebra2	Linear Algebra	Jim Hefferon	Virginia Commonwealth University Mathematics (2009)	13: 978-0982406212	5	0
	Elementary Linear Algebra	Howard Anton	John Wiley & Sons; 8th Edition edition(2000)	13: 978-0471170556	5	0
MATH433 Mathematical Logic	A Mathematical Introduction to Logic, Second Edition	Herbert Enderton , Herbert B. Enderton	academic Press(2001)	13: 978-0122384523	5	0
	Mathematical Logic	Stephen Cole Kleene	Dover Publications (2002)	13: 978-0486425337	5	0

Course name	Book's name	Author	Publishing House	ISBN	N. copies	Available Copies
MATH334 Discrete Mathematics	Discrete Mathematics and Its Applications 5 edition	Kenneth H. Rosen	McGraw-Hill Science/Engineering/Math (2003)	13: 978-0072930337	5	0
	Discrete Mathematics, 7th Edition	Richard Johnsonbaugh	Pearson (2007)	-13: 978-0131593183	5	0
MATH485 Fourier Analysis	Fourier Analysis	T. W. Körner	Cambridge University Press (1989)	-13: 978-0521389914	5	0
	Fourier Analysis and Its Applications	Gerald B. Folland	American Mathematical Society (2009)	-13: 978-0821847909	5	0
MATH454 Optimization Technique	Nonlinear Programming: Theory and Algorithms [Hardcover	Mokhtar S. Bazaraa	John · Wiley and Sons Ltd(2013)	10-0-471-48600-0 13:978-0471	5	0
	Introduction to the Theory of Nonlinear Optimization	Jahn, Johannes	Springer (2007)	978-3-540-49379-2	5	0
MATH335 Mathematics History	A History of Mathematics, Second Edition	Carl B. Boyer, Uta C.Merzbach , Isaac Asimov	Wiley (1991)	13: 978-0471543978	5	0
	A Concise History of Mathematics: Fourth Revised Edition	Dirk J. Struik	Dover Publications (1987)	13:978-0486602554	5	0

Course name	Book's name	Author	Publishing House	ISBN	N. copies	Available Copies
MATH405 Calculus of Variations	An Introduction to the Calculus of Variations	Charles Fox	Dover Publications (2010)	13: 978-0486654997	5	0
	Introduction to the Calculus of Variations	Bernard Dacorogna	Imperial College Press; 2 edition (2008)	-13: 978-1848163348	5	0
MATH482 Real Analysis 2	Introduction to Real Analysis	William F. Trench Hyperlinked	Pearson Education (2012)	0-13-045786-8	5	0
	Real Analysis 4th Edition	H. Royden, P. Fitzpatrick	Macmillan Publishing Co.,Inc. New York (2010)	10:013143744x 13:978-0131437470	5	0
MATH412 Topics in Applied Mathematics	Introduction to Theoretical and Computational fluid dynamics	C. Pozrikidis	Oxford University (2011)	13: 978-0199752072	5	0
	Mathematical Methods in the Physical Sciences	Mary L. Boas	Johan Wiely, Sons, Inc. (1995)	13:978-0-471-19826-0	5	0
Stat 303 Inventory Models	Principles of Inventory and Materials Management 4th Edition	Richard J. Tersine	Prentice Hall (1993)	13: 978-0134578880	5	0
	Operations Research: An Introduction (9th Edition)	Hamdy A. Taha	Prentice Hall (2010)	13: 978-0132555937	5	0

Course name	Book's name	Author	Publishing House	ISBN	N. copies	Available Copies
MATH311 Financial Mathematics	Pacification Of Options Futures and Other Derivatives (With CD) 7th Edition	John C Hull, Sankarshan Basu	Pearson (2009)	13:9788131723586	5	0
STAT404 Data Analysis	Applied Statistics and Probability for Engineers	Douglas C. Montgomery, George C. Runger	Wiley; 4 edition (2006)	78-13: 0471745891	5	0
	Statistical Data Analysis	Glen Cowan	Oxford University,USA (1998)	13: 978-0198501558	5	0

Eighth: The future plan for the program: (here meant the strategic plan of the department during the five years since the start of the work program)

2 -Training plan be developed and implemented for students

- Choose courses that need to Field Training
- Identification of field training hours for each course
- formation of a committee of staff members of the department to oversee on the training
- student assessment

3-Steps that will be taken to ensure the quality of education in the department through academic advising:

1. The establishment of a committee to guide the academic department and distributed to members of the student department
2. Continuous follow-up of the Committee for academic supervisor to do its part in solving the problems faced by students
3. Work meetings with students on an ongoing basis by the Commission

4-Tests:

1. The establishment of a committee of the department for tests
2. Meeting with students and took their perceptions about the scale tests
3. Working to solve the problems faced by students opposed to the tests in the table

4. Receipting a copy of the papers questions about tests
5. Clarify the distribution of grades for each course of study and announcing to the students

The teaching process:

1. The distribution of courses to members of the department
2. Course schedule and the work of the announcement by the bulletin board department before the beginning of the semester with a time sufficient to allow for students to register
3. Follow the status of the teaching classrooms
4. Provide teaching supplies (pens - blackboards - install programs for students on computers lab department)

Graduation Projects:

1. Announcement bulletin board department for students registration requirements for graduation project
2. Recording the wishes of students
3. Distribution of students according to their wishes to the staff of the department
4. Appointment to discuss projects

Training:

Other things (as unwillingly): field training

Ninth: quality requirements: (model b)

• **- Study Plan (academic program):** 1- Are the descriptions of programs depending on the quality requirements? 2- Does the program achieve educational outcomes that have been developed?	√ Yes □ Partialy □ No □ √ Yes □ Partialy □ No □

• **scientific description of courses**: • Is the description of courses in accordance with the quality standards and compare them with their counterparts in other universities? • Have you been to choose courses according to the rates that meet the learning outcomes of the program? • Are the outputs of scientific courses according to specified criteria?	√ Yes □ Partialy □ No □ √ Yes □ Partialy □ No □ √ Yes □ Partialy □ No □
Teaching staff • Have you been choosing specialties with professors in order to achieve the objectives of the course? • Do you think that the necessary disciplines are available for your department? • In case of difficulty provide qualified teaching staff, what is your plan to find alternatives? The assignment of the corresponding sections of the collaborators, which is available by Specialization	√ Yes □ Partialy □ No □ √ Yes □ Partialy □ No □ √ Yes □ Partialy □ No □

The consistency of the expected learning outcomes program with the National Qualifications Framework and benchmarking:

Face comparison	National Qualifications Framework	enchmarking	The proposed program	The consistency **range**
Knowledge Facts Concepts Theories Procedures	Have a thorough knowledge with an integrated and systematic in the field of study, and the basic principles and theories related to this fild field.	Provide students with the knowledge and mathematical sciences and methods applied in other sciences and Creative induction among students through scientific	By the end of the graduate mathematics program is capable of retrieving information and understand that countless comprehensive	Consistent

	Have conversantion with the knowledge and theories in other scientific fields this related to field, and be familiar with the latest developments in the disciplines included in his study field , including the higher consciousness modern research related to finding solutions to the issues and increase knowledge in the field of specialization	research. - Provide students with a number of mental skills like thinking, analysis , logical reasoning, problem solving skills and decision-making. - The development of mathematical reasoning skills , logical in dialogue and discussion. -. Development skill the ability to judge the results. - Acquire the skill of communication , programs, computational skills to stimulate mathematical thinking ,understanding and solving mathematical problems	knowledge in an integrated and structured in the following areas -Numerical mathematics, and the different ways in which they are used numerical information. - Summary of algebraic relations, and its role in solving the problems expressed in the form of symbolism in the development of mathematical theories and technology. - Mathematical methods and technology that deals with the differential equations and their applications. - Geometric concepts, and methods of measuring the qualities of things. - The concept of the function and its	

			role in the mathematical analysis. - Pure mathematics, and calculation methods, and the capacity to solve the problem of multi-specific numerically without resorting to direct count. - Probability and statistical models to work inferences from reality. - Action model and encoding to a problem. - Deductive nature of mathematics,the definition ,axioms and theorems to identify and configure properly debate	
Cognitive skills	That can do surveys, understand the information and concepts, and new evidence from a variety of sources,	Skill flexibility, skill illustration, skill descriptions, Judgments skill, the skill of finding, comparing skill, problem solving skill, skill generalization .	By the end of the graduate mathematics program will be able - Develop ideas and mathematical	Consistent

	apply the results to a wide range of issues and problems with a small amount of guidance. Also, that can be looking relatively complex problems using a variety of forms of information technology and other sources,propose innovative solutions, taking into account their theoretical knowledge , practical experiences related and consequent decisions taken, can apply these skills In academic and professional contexts related to the field of study		methods in the form of equations using the vocabulary and the appropriate mathematical symbols - Identify, compare, and convert goals mathematical - View, summarize, analyze problems - The development of the relationship between the different branches of mathematics and mathematics with other sciences - Use appropriate means to study applied Mathematics	
	Contribute to and works to facilitate constructive	Collaborative work skill, the skill of collective decision-	By the end of the graduate mathematics	Consistent

Skills, interpersonal relationship and responsibility	solutions to the issues in the collective attitudes, whether in a leadership position, or was a member of the group. And can be exercised leadership of the group in a variety of situations require innovative responses. The initiative in identifying issues that require special attention and address them appropriately either individually or through collective action. Assume responsibility for self-learning and can be determined and used means of finding new information or analysis methods needed to accomplish the tasks assigned to	making, effective communication skills, negotiation skill, skill accept criticism from others, the skill of the group's leadership, skill, responsibility and success of the work .	program will be able - Teamwork, time management and effective cooperation and communication with others positively. - The ability to perceive the relations and link them in different positions	

	it			
Communication skills	Can be determined statistical methods relevant when examining the issues and problems, and creatively applied in interpreting the information and propose solutions. - Can communicate effectively verbally and in writing, selects,uses appropriate forms of presentation of the different issues and different recipients. - Is used routinely (routinely) more information and communication technologies are appropriate in the collection, interpretation, communication of information and	The use of modern technology in communication and teaching process. Use of information technology to access information and save recovered and processed. - The use of electronic programs	The use of modern technology in the presentation and report writing - Discover how to use the technology in the exploration and creation of new ideas, identify trends, and forecasting. - Gain fluency in foreign languages and mathematics-based solutions. - Discuss the positive trends towards the use of technology, as well as the responsible use of information. - Using the basics of statistical methods and techniques in the field of mathematical	Consistent

	ideas.			
Psychomotor skills	No	No	No	No

The core outputs of the academic program(Put the sing x in the cell which verify the out come of the course

1 - The student learns the deductive nature of mathematics, and the role of definitions , axioms and theorems to form a true debate effectively.

2 - To provide students the theories and applications of other Mathematical fields.

3 - The student learns to numerical mathematics and the different methods in which the use of numerical information

4 - The student learns the algebraic relations and their role in solving the problems expressed in the form of a symbolic and in the development of mathematical theories

5-To determine the student's mathematical methods and technology that deal with differential equations and their applications

6 – To mentioned the student geometrical concepts and methods of measuring things recipes

7 –To determine the student calculation methods and capabilities of multiple pure mathematics to solve a specific problem numerically without resorting to direct count

8 –The ability to put ideas and mathematical methods in the form of equations using the vocabulary and the appropriate mathematical symbols

9 - The ability to encode problems in mathematical models and use these models for the evaluation and decision-making

10 - The ability to view , summarize and analyze problems

11 − The ability to develop the relationship between the different branches of mathematics ,and between mathematics with other sciences

12 − The ability to use appropriate means to study Applied Mathematics

13 −To judge the accuracy of the mathematical methods and the appropriateness of the results

14 −To determine the students a range of the credibility for mathematical discussions , the sincerity and reasonableness of results

15 − The use of modern techniques in communicating with others and fruitful cooperation with them in a professional manner .

16 − Discover how to use the technology in the exploration and creation of new ideas, identify trends , and forecasting .

17 − Using the basics of statistical and mathematical methods ,and techniques in the study field

Course Name	Course Code	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Introduction to Mathematics 1	**Math 112**	X			X										X			
Introduction to 2Mathematics	**Math127**	X			X										X			
Mathematics Basis	**Math 231**	X			X													X
Statistics and probability(1)	**Stat 201**	X										X			X			

Course Name	Course Code	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Calculus 1	**Math 201**	X							X				X					
Introduction to geometry	**Math 271**	X			X		X											
Calculus 2	**Math 202**	X	X								X							
Calculus in several variables	**Math 203**		X									X		X	X			
Vector Calculus	**Math 204**	X					X		X			X						
Linear Algebra 1	**Math 241**	X	X		X													
Introduction to Differential Equation	**Math 321**		X						X			X						
Numerical Analysis 1	**Math 351**			X								X		X	X			
Linear Programming	**Math 352**		X							X	X				X			
Mathematical application in computer	**Math 353**		X	X											X	X		
Mathematical Methods	**Math 322**	X	X				X											
Group Theory	**Math 342**	X										X			X			
Statistics and probability 2	**Stat 302**		X								X				X			X
Real Analysis	**Math 381**	X																

Course Name	Course Code	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Partial Differential Equations	**Math 423**		X						X				X		X			
Rings and Fields	**Math 443**	X										X				X		
Introduction to Topology	**Math 472**	X										X						
Introduction to Differential Geometry	**Math 473**	X	X				X											
Complex Analysis	**Math 483**	X	X									X						
Introduction to functional analysis	**Math 484**	X													X			
Project	**Math 499**								X		X							
Number Theory	**344MATH**	X		X				X										
Graph Theory	**MATH 332**				X				X			X						
Linear Algebra 2	**MATH 345**		X									X		X				
Mathematical logic	**MATH 433**	X							X			X						
Fourier Analysis	**MATH 485**		X				X					X						

Course Name	Course Code	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Discrete Mathematics	**Math 334**	X	X					X							X			
Optimization Technique	**Math454**		X		X				X	X								
Calculus of Variation	**Math 405**	X	X									X			X			
Real Analysis 2	**Math 482**	X												X				
Mathematics History	**MATH 330**										X				X			
Topics in Applied Mathematics	**Math 412**	X							X				X	X				
Financial Mathematics	**MATH 311**		X		X										X			
Numerical Analysis 2	**MATH 455**			X										X	X	X		
Data Analysis	**Stat 404**		X								X						X	X
Inventory Models	**303MATH**		X									X		X				X

Student Affairs:

Procedures that are followed in the evaluation of the student:

Distribution of marks

Assessment methods Semester grades work 40%	Proportion of Final Assessment
Homework and discussions	10%
First mid term exam	15%
Second midterm exam	15%
Final exam	60%
Total	100%

Note: - Based on the Deanship of Admission (tests and estimates) item 3 If you require a study of project course (search) more than a semester, the student get on continuous estimate (m) or (IP), after that if he finshed the course ,he will take the estimation in which he got, and if you do not complete the scheduled time,the department councile give to the student the estimation (IC) in the student's record

- **the procedures that will be used to examine the achievement of the standards**:

1 - create a unit of quality in the program
2 - named coordinator of the quality of the program
3 - work of the organizational structure of the program
4 - Action questionnaires students
5 - Action questionnaires faculty members
6 - Action questionnaires measuring user satisfaction
7 - reports
8 - interviews
9 - field visits

procedures to be followed to target the Academic Advising

1 . Been the formation of committees of faculty members to receive the new students and explaining the operation of the Department and College
2 . Distribution of all students on academic counselors so that there is a academic guid for each student and a maximum of 10 students per guide if possible.
3 . Appoint and announce office hours for each faculty member on their offices so that part of it is dedicated to academic counseling and the other part to help the students in the educational process .

4 . The availability of complete information about the department, its members , ways to contact them and announced bulletin board section .
5 . Communicate with the head / coordinator of the department in the event of problems or difficulties in the educational process
6 . Put a fund to receive student complaints deal with head / coordinator of the department in secret

- **The student grievance procedures and the mechanism used**

According to the list of Higher Education

7 - program evaluation and improvement process

Tenth : Approve of the program (Form A)

The program will be approved at the level of the department and the college, and reviewed by the Deanship of quality and skills development through the following sample preparation for submission to the Standing Committee of the university plans

No.	Item	Yes	No	Notes
1	Been applying for approval of a new plan or plan amendment List	√		
2	Formed a committee to study the proposed plan of study in . department	√		Attachment decision to form the committee
3	Held a training workshop for faculty members in the development of plans and programs of study.	√		Workshop was held at the Faculty of Science + attend the building plan 30-4-2012
4	The plan was approved at the department council in the official minutes of the meeting on 12.06.1434	√		Attachment decision of the department council
5	The plan was approved at the college council in the official minutes of the meeting on 19.06.1434	√		Attachment decision of the college council

No.	Item	Yes	No	Notes
6	Was adopted the National Qualifications Framework	√		Yes, we adopt
7	Has been guided by a set of study plans modern Arab and international universities (list attached).?	√		Qassim University, King Saud University, Princess Nora University and facility model shows how consistency
8	Has been guided by the views of the concerned subject of employers (list attached).	√		Questionnaires Attachment
9	Was guided by international reference in the field of specialization (list attached).	√		Harvard University finds Attachment shows how this guided
10	Students were polled in the study plan through (questionnaires, workshops, meetings, email, etc. ....) (samples attached).	√		Questionnaires Attachment
11	Graduates were polled in the study plan through (questionnaires, workshops, meetings, email, etc. ....) (samples attached).	√		Questionnaires Attachment
12	Been identified learning outcomes (skills, knowledge, attitudes) (to be determined at the level of the university, college, department).	√		Attachment learning outcomes
13	The plan contains a field training course (as much as possible).	√		There is a field training course
14	Has been intensified practical side in some courses (as possible)	√		Yes
15	The plan was to include a program of cooperative training (as much as possible).	....		.....
16	Attention has been developed specialized skills and increase	√		Yes

No.	Item	Yes	No	Notes
17	A model contains on the program specification	√		Attachment model of the program specification
18	A model contains on the courses specification	√		The model is being updated according to the model of the plan amendment request
19	language teaching	√		English
20	Summary Course Description.	√		Model (5) for each course
21	Model is included requirements to apply the study plan	√		Yes
22	A minimu credit hours.	√		120<137<144
23	vision, mission and goals.	√		Mentioned in the model.
24	the plan is reviewed by by specialists	√		A copy of the decision is attached
25	Named been determined qualified graduate who gets it.	√		Bachelor of Science in Mathematics
26	the conditions for joining the program	√		Mentioned in the model.
27	employers have been identified that can be staffed by graduates	√		Mentioned in the model.
28	Matrix preparation program	√		Mentioned in the model.

No.	Item	Yes	No	Notes
29	Have been prepared in a matrix consistency of the program with the National Qualifications Framework and benchmarking.	√		Mentioned the model is consistent with the Princess Noura University

Appendix A: Forms

The adoption of the program model (model A)
2. Program specification model (model B)
3. Model study plan (Form C)
4. Model requirements software application (Form D)
5. Model Summary Course Description (Form H)