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QF01/0408-4.0E	**Course Plan for Bachelor program - Study Plan Development and Updating Procedures/ Department of Mathematics**

Study plan No.	2021/2022	University Specialization	Master in Mathematics
Course No.	0101742	**Course name**	**Applied mathematics (2)**
Credit Hours	3	**Prerequisite/ Co-requisite**	0101741

Course type	☐ MANDATORY UNIVERSITY REQUIREMENT	☐ UNIVERSITY ELECTIVE REQUIREMENTS	☐ FACULTY MANDATORY REQUIREMENT	☐ Support course family requirements	☐ Mandatory requirements	✓ Elective ✓ requirements
Teaching style	☐ Full online learning		✓ Blended learning		☐ Traditional learning	
Teaching model	☐ 1 Synchronous: 1 asynchronous		✓ 1 face to face : 1 asynchronous		☐ 2 Traditional	

Faculty member and study divisions' information (to be filled in each semester by the subject instructor)

Name	Academic rank	Office No.	Phone No.	E-mail	
Division number	**Time**	**Place**	**Number of students**	**Teaching style**	**Approved model**
				Blended learning	

Brief description

PDEs of Mathematical Physics, separation of variables, Transform Methods, Eigen function expansions, Green's Function, Approximation Methods, Integral Equations.

Learning resources

Course book information (Title, author, date of issue, publisher ... etc)	1. Tyn Myint-U, Partial Differential Equations for Scientists and Engineers, Science Publishing Co. Inc., New York (1987). 2. Lawrence C. Evans, Partial Differential Equations, American Mathematical Society (2010). 3. Ram P. Kanwal , Linear Integral Equations: Theory and Technique, Academic Press, New York (1971).
Supportive learning resources (Books, databases, periodicals,	1. J. Ray Hanna, John H. Rowland, Fourier Series, Transforms, and Boundary Value Problems: Second Edition, Dover Publications, Inc., New York (2008). 2. A. H. Nayfeh, Perturbations Methods, New york (1973).

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software, applications, others)	
Supporting websites	1. http://ocw.mit.edu/courses/mathematics/ 2. http://ejde.math.txstate.edu.
The physical environment for teaching	✓ Class room ☐ labs ✓ Virtual educational platform ☐ Others
Necessary equipment and software	
Supporting people with special needs	
For technical support	

Course learning outcomes (S= *Skills, C= Competences K= Knowledge,*)

No.	Course learning outcomes	The associated program learning output code
Knowledge		
K1	Define the basic concepts of Separation of Variables and Characteristic Lines, Laplace and Fourier transforms. Solve Integral Equations	**MK1**
K2	Build Asymptotic Methods and Variational Methods	**MK2**
Skills		
S1	Select proper procedure to solve a given differential equations	**MS1**
S2	Summarize the importance of PDE various aspects of life	**MS1**
S3	Explain the different types of boundary value problems	**MS2**
Competences		
C1	Be involved in the process of illustrating concepts and exploring facts.	**MC1**

Mechanisms for direct evaluation of learning outcomes

Type of assessment / learning style	Fully electronic learning	Blended learning	Traditional Learning (Theory Learning)	Traditional Learning (Practical Learning)
Midterm exam	30%	**30%**	40%	30%
Participation / practical applications	0	**0**	10%	30%
Asynchronous interactive activities	30%	**30%**	0	0
Final exam	40%	**40%**	50%	40%

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Schedule of simultaneous / face-to-face encounters and their topics

Week	Subject	learning style*	Reference **
1	Initial-value and boundary-value problems for partial differential equations,	Lecture	12-27
2	First-Order, Quasi-Linear Equations and Method of Characteristics	Lecture	27-55
3	Mathematical models: The vibrating string, The vibrating membrane, waves in an elastic medium, conduction of heat.	Lecture	63-113
4	Method of separation of variables, existence and uniqueness of solution of the vibrating string problem, existence and uniqueness of Solution of the heat conduction problem,	Lecture	75 – 78 79 – 82
5	Integral transforms, Fourier transforms, Fourier Sine and Cosine transforms	Lecture	125 – 137
6	Laplace transforms, Convolution theorem of the Laplace transform		
7	Hankel transforms, Mellin transforms **Mid Exam 30%**	Lecture	119-124
8	Integral equations. Integral equations with separable kernels, Fredholm integral equation	Lecture	1-23 Ref 3
9	Method of successive approximations, Classical Fredholm theory	Lecture	25-60 Ref 3
10	Applications of integral equations to ordinary and partial equations	Lecture	64-140 Ref 3
11	Asymptotic series	Lecture	9 – 12 Ref 5
12	Asymptotic solution of linear equations	Lecture	308-324 Ref 5
13	Vibrational Methods, existence of minimizers		453-459 Ref 2
14	Regularity, constrains, critical points.		465-507 Ref 2
15	Invariance, Noethetr's Theorm		511-525 Ref 2
16	**Final Exam 50%**		

Schedule of asynchronous interactive activities (in the case of e-learning and blended learning)

Week	Task / activity	Reference	Expected results

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1	Background	Applied mathematics 1	Self-reading and Discussion
2	Video 1 Solving exercises	E-learning	Discussion in the class
3	Home work1:	(Lecture notes and Ref.1)	Submit a pdf or word sheet
4	Quiz 1	On the subjects studied on the first three weeks	Submitting on the E-learning
5	Assignment 1:	Internet sources and the other Supportive learning resources	Presentation
6	Video 2	Solving exercises	Discussion in the class
7	Home work	(Lecture notes and Ref.1)	Submit a pdf or word sheet
8	Assignment 2:	Internet sources and the other Supportive learning resources	Submitted with the mid exam
9	Self-reading		Talk
10	Video3	E-learning	Discussion in the class
11	Home work 3:	(Lecture notes and Ref.1)	Submit a pdf or word sheet
12	Self-reading		Talk
13	Quiz 2	On the subjects studied on the subject studied after midexam	Submitting on the E-learning
14	Presentation of the subject:	Internet sources and the reference book	Video
15	Video 4 Revision of all the course	E-learning	
16	Final Exam	-	