



Ministry of Higher Education and Scientific Research
Mustansiriyah University /College of Science
Department of Mathematics
(الخطة الدراسية للمعاق)
Course Plan



Course No.: 54453124

Time Division: 4hr Theoretical and 1hr Practical

Course Name: Theory of Differential Equations I **Semester & Year:** First, 2022 / 2023

Course Website:

Course Description:

This subject presents the -----

Course Intended Outcomes:

At the end of the Course, students are expected to learn

- 1) Existence of a unique solution of an ordinary diff. equations of 1st, 2nd and nth order
- 2) Existence of a unique solution of a system of ordinary diff. equations of 1st order and finding the solutions for a linear homogeneous and nonhomogeneous systems.
- 3) Laplace transform for solving a system of diff. eqs. with constants coefficients.

Course Outline:

Week	Description depends on the Timing table (Theoretical & Practical)
1	System of diff. eqs, Reducing the diff. eqs. of n th order to a system of 1 st order eqs.
2	Linear homogeneous systems, Nonlinear system of 1 st order eqs.
3	The existence and uniqueness theorem
4	solution matrix and Fundamental matrix solution
5	Calculation of a fundamental matrix, The exponential matrix method
6	Eigenvalues and eigenvectors method
7	First Examination
8	Linear nonhomogeneous systems and their solutions, Liouville theorem
9	Existence theory of standard form of a 1 st order diff. eq , Lipschitz condition, existence of the solutions
10	Uniqueness of the solutions, dependence on initial condition
11	Existence solution on largest interval, Continuation of solutions
12	Existence theory for systems of 1 st order eqs. and higher-order eqs.
13	Gronwall inequality , linear systems and linear homogeneous systems
14	Laplace transform and its inverse, applications to the linear equations with constants coefficients.
15	Second examination

Textbooks:

[1]: Numerical Analysis by Richard L. Burden , 7th Edition (2011).

[2]: An Introduction to Numerical Methods and Analysis by James F. Epperson (2013).

Suggested references:

[1]:

[2]:

Marking:

First Semester				Final Exam
1st exam	2nd exam	Practical	Activity	
10	10	5	5	30

Assignment/ Project	Description	Due Date	Marking
Home work	Some important exercise	13-11-2022	5
Home work	Some important exercise	5-12-2022	5

Instructor(s) information [معلومات الأستاذ]

Department: (Mathematics) ; Lecture Room: [A 201 | , | A 204 |] ; Office No.: (1)

Instructor's Name: **Dr. Lamyaa Hussein Ali**

E-Mail: *lamya_h2@yahoo.com*

Office Hours : Sun.: [10: 10 – 11 : 50 |
Tue.: [8 : 30 – 11 : 00 |

NOTES:

-Office Hour: Other office hours are available by appointment.

-The content of this syllabus not be changed during the current semester.



Lecturer Signature

أ.م.د. لامية حسين علي



Chairman Signature