

# جامعة المستقبل/ كلية الهندسة والتقنيات الهندسية

## قسم هندسة تقنيات الحاسوب

### وصف المقرر للعام الدراسي 2024-2025

1- أسم المقرر	
التحليلات الهندسية	
2- رمز المقرر:	
MU0223003	
3- / السنة الفصل	
سنوي	
4- تاريخ اعداد هذا الوصف	
2024/10/1	
5- أشكال الحضور المتاحة	
حضوري	
6- عدد الساعات الدراسية (الكلية)/ عدد الوحدات (الكلية)	
نظري/2 عملي/2 / المجموع 4 / عدد الوحدات/6	
7- اسم مسؤول المقرر الدراسي ( إذا اكثر من اسم يذكر)	
الاسم: أ.م.د عبدالله جبار حسين علي الأيميل <a href="mailto:abdullah.jabar.hussain@uomus.edu.iq">abdullah.jabar.hussain@uomus.edu.iq</a>	
8- أهداف المقرر	
1- تخريج مهندس كفوء في النمذجة الرياضية لتحليل مشاكل هندسة الكمبيوتر.	أهداف المادة الدراسية
2. تطبيق الأساليب العددية والأدوات الحسابية لتحليل ومحاكاة النظم.	
3. الاستفادة من المفاهيم الرياضية المتقدمة لتحليل هندسة الحاسوب.	
4. تطبيق مبادئ لتحسين أنظمة هندسة الكمبيوتر.	
5. تعزيز مهارات حل المشكلات من خلال التحليل الهندسي في هندسة الكمبيوتر.	
9- استراتيجيات التعليم والتعلم	
تتلخص استراتيجيات التعليم والتعلم بما يلي:	الاستراتيجيات
1. القاء محاضرات , حلول , دروس عملية.	
2. توظيف المهارات الرياضية لفهم المادة	
3. اعتماد واجبات وانشطة منزلية بشكل مناقشات ومسائل ومشاريع والعمل على	

<b>حل المسائل بشكل مجموعات.</b>	<b>مخرجات التعلم</b>
<ol style="list-style-type: none"> <li>1. تطبيق المهارات التحليلية لحل المشكلات الهندسية المعقدة في هندسة الكمبيوتر.</li> <li>2. الاستفادة من النمذجة الرياضية وتقنيات التحليل الإحصائي لتقييم النظام وتحسينه.</li> <li>3. الكفاءة في أدوات التحليل الهندسي وبرامج المحاكاة وتحليل البيانات.</li> <li>4. تفسير وإبلاغ نتائج التحليل الهندسي بشكل فعال.</li> <li>5. تطبيق مهارات حل المشكلات الرياضيه في تحليل هندسة الكمبيوتر.</li> <li>6. تطبيق أمثلة وحلولها بتطبيق على الماتلاب.</li> <li>7. تطوير القدرة على القراءة بشكل معمق واستخراج المعرفة المفيدة.</li> <li>8. التفاعل وحل المشكلات بشكل مجموعات.</li> <li>9. تقديم العروض الأكاديمية العلمية وفق قواعد معتمدة</li> </ol>	

<b>10- بنية المقرر</b>					
طريقة التقييم	طريقة التعلم	اسم الوحدة او الموضوع	مخرجات التعلم المطلوبة حسب اعلاه	الساعات	الاسبوع
Quiz	In class and Lab Lecture	Laplace transform, Properties, theorems and applications	9-1	4	1
Discussion in class	In class and Lab Lecture	Laplace transform, Properties, theorems and applications	9-1	4	2
Exam.	In class and Lab Lecture	Laplace transform, Properties, theorems and applications	9-1	4	3
Quiz	In class and Lab Lecture	Laplace transform, Properties, theorems and applications	9-1	4	4
Home work	In class and Lab Lecture	Laplace transform, Properties, theorems and applications	9-1	4	5
Discussion in class	In class and Lab Lecture	Laplace transform, Properties, theorems and applications	9-1	4	6
Discussion in class	In class and Lab Lecture	Laplace transform, Properties, theorems and applications	9-1	4	7
Home work	In class and Lab Lecture	Z-transform, properties, theorems, and applications	9-1		8
Quiz	In class and Lab Lecture	Z-transform, properties, theorems, and applications	9-1		9
Discussion in class	In class and Lab Lecture	Z-transform, properties, theorems, and applications	9-1		10
Discussion in class	In class and Lab Lecture	Z-transform, properties, theorems, and applications	9-1		11
Quiz	In class and Lab Lecture	Z-transform, properties, theorems, and applications	9-1		12
Home work	In class and Lab Lecture	Z-transform, properties, theorems, and applications	9-1		13
Discussion in class	In class and Lab Lecture	Z-transform, properties, theorems, and applications	9-1		14
Mid Exam.	In class and Lab Lecture	Z-transform, properties, theorems, and applications	9-1		15
Discussion in class	In class and Lab Lecture	Probability (Basic terminology, probability and set notation, law of probability, independent events) ,	9-1		16

		Statistics(Graphical representation, measure of central tendency, measure of dispersion)		
<b>Discussion in class</b>	In class and Lab Lecture	Probability (Basic terminology, probability and setnotation, law of probability, independent events) , Statistics(Graphical representation, measure of central tendency, measure of dispersion)	<b>9-1</b>	<b>17</b>
<b>Discussion in class</b>	In class and Lab Lecture	Probability (Basic terminology, probability and setnotation, law of probability, independent events) , Statistics(Graphical representation, measure of central tendency, measure of dispersion)	<b>9-1</b>	<b>18</b>
<b>Discussion in class</b>	In class and Lab Lecture	Probability (Basic terminology, probability and setnotation, law of probability, independent events) , Statistics(Graphical representation, measure of central tendency, measure of dispersion)	<b>9-1</b>	<b>19</b>
<b>Report</b>	In class and Lab Lecture	Numerical computations (bisection method, false position method, Newton-Raphson method, solution of algebraic and transcendental equations, solution of linear simultaneous equations 1)Direct methods a)Gauss elimination B)Gauss Jordan 2)Iterative method a)Jacobi's B)Gauss-seidel iteration)	<b>9-1</b>	<b>20</b>
<b>Quiz</b>	In class and Lab Lecture	Numerical computations (bisection method, false position method, Newton-Raphson method, solution of algebraic and transcendental equations, solution of linear simultaneous equations 1)Direct methods a)Gauss elimination B)Gauss Jordan 2)Iterative method a)Jacobi's B)Gauss-seidel iteration)	<b>9-1</b>	<b>21</b>
<b>Discussion in class</b>	In class and Lab Lecture	Numerical computations (bisection method, false position method, Newton-Raphson method, solution of algebraic and transcendental equations, solution of linear simultaneous equations 1)Direct methods a)Gauss elimination B)Gauss Jordan 2)Iterative method a)Jacobi's B)Gauss-seidel iteration)	<b>9-1</b>	<b>22</b>
<b>Discussion in class</b>	In class and Lab Lecture	Numerical computations (bisection method, false position method, Newton-Raphson method, solution of algebraic and transcendental equations, solution of linear simultaneous equations 1)Direct methods a)Gauss elimination B)Gauss Jordan 2)Iterative method a)Jacobi's B)Gauss-seidel iteration)	<b>9-1</b>	<b>23</b>
<b>Participation of students in solving problems</b>	In class and Lab Lecture	Solution of nonlinear equation (Newton-Raphson method)	<b>9-1</b>	<b>24</b>
<b>Mid Exam-2</b>	In class and Lab Lecture	Solution of nonlinear equation (Newton-Raphson method)	<b>9-1</b>	<b>25</b>
<b>Participation of students in solving problems</b>	In class and Lab Lecture	Numerical solution of ordinary differential equation(Picard's , Euler's method)	<b>9-1</b>	<b>26</b>
<b>Discussion in class</b>	In class and Lab Lecture	Numerical solution of ordinary differential equation(Picard's , Euler's method)	<b>9-1</b>	<b>27</b>
<b>Discussion in class</b>	In class and Lab Lecture	Numerical solution of ordinary differential equation(Picard's , Euler's method)	<b>9-1</b>	<b>28</b>
<b>Exam.</b>	In class and Lab	Matrices (Matrix operations, related matrices,	<b>9-1</b>	<b>29</b>

	Lecture	solution of linear system of equations, linear transformations, Cayley-Hamilton theorem)		
Discussion in class	In class and Lab Lecture	Matrices (Matrix operations, related matrices, solution of linear system of equations, linear transformations, Cayley-Hamilton theorem)	9-1	30

## 11- تقييم المقرر

توزيع الدرجة من ١٠٠ على وفق المهام المكلف بها الطالب مثل التحضير اليومي والامتحانات اليومية والشفوية والشهرية والتحريرية والتقارير .... الخ

درجة المشاركة	امتحان	...	الفصل الثاني			الفصل الاول		
			فصلي	نشاطات	عملي	فصلي	نشاطات	عملي
100	50	50	10	5	10	10	5	10

## 12- مصادر التعلم والتدريس

<ol style="list-style-type: none"> <li>Numerical and Engineering Analysis: Computer-Aided Design by Python (Computing) by Samir A bood</li> <li>Fundamental of engineering analysis by Parviz Moin</li> <li>Engineering Analysis by Merle C. Potter</li> </ol>	الكتب المقررة المطلوبة (المنهجية)
<ol style="list-style-type: none"> <li>Laplace Transform by Merle C. Potter</li> <li>Advanced Engineering Mathematics by Stroud</li> </ol>	المراجع الرئيسية (المصادر)
Applied Engineering Analysis by Tai-Ran Hsu	الكتب والمراجع الساندة التي يوصى بها (المجلات, التقارير, الاوراق البحثية ....)
Related websites	المراجع الالكترونية (مواقع الانترنت)

## Course Description Form

1- Course name

Engineering Analysis

2- Course code

MU0223003

3- Semester/Year

Yearly

4- Description and preparation date

1-10-2024

5- Available attendance form

Class only

6- Number of Credit Hours (Total) / Number of Units (Total):

Theoretical / 2 practical / 2 All / 4 units / 6

7- Course administrator's name (mention all, if more than one name)

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8- course objectives

<p><b>Course objectives</b></p>	<p>1- 1-Graduating an engineer competent in mathematical modeling to analyze computer engineering problems.</p> <p>2-Apply numerical methods and computational tools to analyze and simulate systems.</p> <p>3-Utilizing advanced mathematical concepts to analyze computer architecture.</p> <p>4-Apply principles to improve computer engineering systems.</p> <p>5. 5-Enhance problem-solving skills through geometric analysis in computer engineering</p>
<p>9- teaching and learning strategies</p>	
<p>strategies</p>	<p>Teaching and learning strategies are summarized as follows:</p> <ol style="list-style-type: none"> <li>1. Giving lectures, solutions, and practical lessons.</li> <li>2. Using mathematical skills to understand the material</li> <li>3. Adopting homework and activities in the form of discussions, issues, projects, and work</li> </ol>
<p>10- learning outcomes</p>	

Learning outcomes

1. Apply analytical skills to solve complex engineering problems in computer engineering.
2. Utilizing mathematical modeling and statistical analysis techniques to evaluate and improve the system.
3. Proficiency in engineering analysis tools, simulation programs, and data analysis.
4. Interpret and communicate the results of engineering analysis effectively.
5. Apply mathematical problem-solving skills in computer engineering analysis.
6. Applying examples and their solutions using MATLAB.
7. Develop the ability to read in depth and extract useful knowledge.
8. Interact and solve problems in groups.
9. Submitting scientific academic presentations according to approved rules

11- course structure

Evaluation methods	Learning methods	Subject name	Learning outcomes	Hours	weeks
Quiz and Discussions In class	Class and lab.	Laplace transform Properties, theorems And applications	1-9	28	1,2,3,4,5,6,7
Quiz and Discussions	Class and	<b>Z-transform, properties, theorems, and</b>	1-9	32	8,9,10,11,12,13,14,15

In class	lab.	applications			
Quiz and Discussions In class	Class and lab.	<b>Probability (Basic terminology, probability and set notation, law of probability, independent events) ,</b>  <b>Statistics(Graphical representation, measure of central, tendency, measure of dispersion)</b>	1-9		15,16,17, 18,19
Quiz and Discussions In class	Class and lab.	<b>Numerical Computations (bisection method, false position method, Newton-Raphson method, solution of algebraic and transcendental equations, solution of linear simultaneous equations 1) Direct methods a)Gauss elimination B)Gauss Jordan 2) Iterative method a)Jacobi's B)Gauss-seidel iteration)</b>	1-9	16	20,21,22, 23
Quiz and Discussions In class and Mid exam.	Class and lab.	<b>Solution of Nonlinear Equation (Newton-Raphson method)</b>	1-9	8	24,25
Quiz and Discussions In class	Class and lab.	<b>Numerical solution of ordinary differential equation(Picard's , Euler's method)</b>	1-9	12	26,27,28
Quiz and	Class and	<b>Matrices (Matrix</b>	1-9	8	29,30

Discussions In class	and lab.	<b>operations, related matrices, solution of linear system of equations, linear transformations, Cayley-Hamilton theorem)</b>			
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**12–Course evaluations**

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports.... etc

Course I			Course II			Average	Final Exam	Final Grade
Mid	Practical	Activity	Mid	Practical	Activity			
10	10	5	10	10	5	50	50	100

**13– learning and technical resources**

Required text book	<ul style="list-style-type: none"> <li>4. Numerical and Engineering Analysis: Computer-Aided Design by Python (Computing) by Samir A bood</li> <li>5. Fundamental of engineering analysis by Parviz Moin</li> <li>6. Engineering Analysis by Merle C. Potter</li> </ul>
Main reference course	<ul style="list-style-type: none"> <li>3. Laplace Transform by Merle C. Potter</li> <li>4. Advanced Engineering Mathematics by Stroud</li> </ul>
Important books	<b>Applied Engineering Analysis by Tai-Ran Hsu</b>
Internet websites	Related websites