# نموذج وصف المقرر

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|---|---|
| 1. اسم المقرر : | |
| التحليل الهندسي | |
| 2. رمز المقرر : | |
| | |
| 3. الفصل / السنة : | |
| 2023 /2024 | |
| 4. تاريخ إعداد هذا الوصف : | |
| 2024/4/30 | |
| 5. أشكال الحضور المتاحة | |
| اسبوعي نظري | |
| 6. عدد الساعات الدراسية (الكلي)/ عدد الوحدات (الكلي) : | |
| عدد الساعات الدراسية (الكلي)/ 90 ساعة | |
| 7. اسم مسؤول المقرر الدراسي ( اذا اكثر من اسم يذكر) : | |
| الاسم: د.ستار موزان | |
| 8. اهداف المقرر | |

| اهداف المادة الدراسية | 1. تعليم الطالب معرفة المعادلات التفاضلية المختلفة |
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| | 2. تعليم الطالب المبادئ الأساسية لحل المعادلات التفاضلية |
| | 3. تهيئة الطالب لدراسة العمليات الرياضية |
| | 4. تهيئة الطالب لدراسة التطبيقات الهندسية. |

## 9. استراتيجيات التعليم والتعلم

| الاستراتيجية | المعادلات التفاضلية الاعتيادية من الرتبة الأولى و تطبيقاتها 2. المعادلات التفاضلية الاعتيادية الخطية و تطبيقاتها .تحويلات لا بلاس ودالتي المفكوك وكاما 4. حل المعادلات التفاضلية الاعتيادية الخطية باستخدام تحويلات لا بلاس .جبر المصفوفات والمحددات 6. حل مجموعة من المعادلات الجبرية الخطية باستخدام قاعدة كريمر وطريقة معكوس المصفوفة 7. مسائل القيم الذاتية 8. حل مجموعة من المعادلات التفاضلية الاعتيادية باستخدام قاعدة كريمر وتحويلات لا بلاس 8. متسلسلة فورير وتطبيقاتها 9. المعادلات التفاضلية الجزئية وتطبيقاتها |
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## 1. بنية المقرر

| الأسبوع | الساعات | مخرجات التعلم المطلوبة | اسم الوحدة او الموضوع | طريقة التعلم | طريقة التقييم |
|---|---|---|---|---|---|
| 1 | 3 | فهم الطالب للموضوع | Introduction | امثلة اضافية | أسئلة عامة و مناقشة |
| 2 | = | = | Definition of Differential Equations | = | = |
| 3 | = | = | 2- Ordinary Differential Equations of First Order | = | = |

| | | | | | |
|---|---|---|---|---|---|
| = | = | 2.1- Separable First Order Differential Equations | = | = | 4 |
| = | = | 2.2- Homogeneous First Order Differential Equations | = | = | 5 |
| = | = | 2.3- Exact First Order Differential Equations | = | = | 6 |
| = | = | 2.4- Non-Exact First Order Differential Equations | = | = | 7 |
| = | = | 2.5- Linear First Order Differential Equations | = | = | 8 |
| = | = | 3- Applications First Order Differential Equations | = | = | 9 |
| = | = | 4- Linear Ordinary Differential Equations with Constant Coefficients | = | = | 10 |
| = | = | 4.1- Homogeneous Second Order Linear Differential Equations | = | = | 11 |
| = | = | 4.2- Non-Homogeneous Second Order Linear Differential Equations | = | = | 12 |
| = | = | 4.2.1- Method of Undetermined Coefficients | = | = | 13 |
| = | = | 4.2.2- Method of Variation of Parameters | = | = | 14 |
| = | = | اختبار فصلي | = | = | |
| = | = | 4.4- Euler's Equation | = | = | 15 |
| = | = | 5- Applications Second Order Differential Equations | = | = | 16 |
| = | = | 6- Simultaneous Linear Ordinary Differential Equations | = | = | 18 |
| = | = | - Numerical Analysis | = | = | 19 |
| = | = | Solution of Nonlinear Equation | = | = | 20 |
| = | = | Interpolation Polynomials | = | = | 21 |
| = | = | Numerical Differentiation | = | = | 22 |
| = | = | Numerical Integration | = | = | 23 |
| = | = | Numerical Solution of Ordinary Differential Equation | = | = | 24 |
| = | = | 2- Determinate and Matrices | = | = | 25 |
| = | = | Determinant | = | = | 26 |
| = | = | Properties of Determinants | = | = | 27 |
| = | = | Solution of Simultaneous Linear Equations by Determinants | = | = | 28 |
| = | = | Matrices | = | = | 29 |
| = | = | Matrices of Types | = | = | 30 |

## 2. تقييم المقرر

توزيع الدرجة من 100 على وفق المهام المكلف بها الطالب مثل التحضير اليومي والامتحانات اليومية والشفوية والشهرية والتحريرية والتقارير .... الخ

| | 3. مصادر التعلم والتدريس |
|---|---|
| 1. Kreyszib, E. (2010). "Advanced Engineering Mathematics." John Wiley & Sons, USA, 3th edition. 2.Bronson, R.(2018). "Modern Introductory Differential Equations." McGraw-Hill, U | الكتب المقررة المطلوبة ( المنهجية أن وجدت ) |
| Numerical Analysis for Engineers Methods and pplications", 2$^{th}$ Edition/Bilal M· Ayyub, and Richard H· | المراجع الرئيسة ( المصادر) |
| Numerical Analysis for Engineers Methods and Applications 2$^{th}$ Edition/Bilal M· Ayyub, and Richard H· | الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية، التقارير ....) |
| Google , Facebook , You T ، المملكة الافتراضية | المراجع الإلكترونية ، مواقع الانترنيت |

# Course Description Form

| 1. Course Name: |
|---|
| Analysis of engineering |

| 2. Course Code: |
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| |

| 3. Semester / Year: |
|---|
| 2024 |

| 4. Description Preparation Date: |
|---|
| 2024/4/30 |

| 5. Available Attendance Forms: |
|---|
| Class lectures |

| 6. Number of Units (Total) |
|---|
| Number of Credit Hours (Total) /90 |

| 7. Course administrator's name (mention all, if more than one name) |
|---|
| Name: Dr.Sattar Mozan<br>Email: |

## 8. Course Objectives

| Course Objectives | 1- Teaching the student to know the various differential equations 2. Teaching the student |
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| | the basic principles of solving differential equations 3. Preparing the student to study mathematical operations 4. Preparing the student to study engineering applications |
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## 9. Teaching and Learning Strategies

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| **Strategy** | 1. First-order ordinary differential equations and their applications 2. Linear ordinary differential equations and their applications 3. Laplace transformations, expansion and gamma functions 4. Solving linear ordinary differential equations using Laplace transformations 5. Algebra of matrices and determinants 6. Solving a set of linear algebraic equations Using Cramer's rule and the matrix inverse method 7. Eigenvalue problems 8. Solving a set of ordinary differential equations using Cramer's rule and Laplace transformations 8. Fourier series and its applications 9. Partial differential equations and their applications |

## 10. Course Structure

| Week | Hours | Required Learning Outcomes | Unit or subject name | Learning method | Evaluation method |
|---|---|---|---|---|---|
| **1** | 3 | Student understanding | An introduction to civil drawing and all applications in the engineering and industrial fields between the engineer and the worker | practical | General questions and discussion |
| **2** | = | = | Concrete drawing and how to take longitudinal and cross sections in multi-storey buildings, showing details of ceilings, beams, columns, stairs and the base. | = | = |
| **3** | = | = | Reinforced concrete foundations, wall foundations, insulated, compact, strip, continuous, raft foundations | = | = |
| **4** | = | = | Influence of composition upon characteristic of p.c | = | = |
| **5** | = | = | Reinforced concrete foundations, wall foundations, insulated, compact, strip, continuous, raft foundations | = | = |
| **6** | = | = | Reinforced concrete foundations, wall foundations, insulated, compact, strip, continuous, raft foundations | = | = |
| **7** | = | = | Reinforced concrete foundations, wall foundations, insulated, compact, strip, continuous, raft foundations | = | = |
| **8** | = | = | Reinforced concrete foundations, wall foundations, insulated, compact, strip, continuous, raft foundations | = | = |

| 9 | = | = | Reinforced concrete columns and cross sections | = | = |
|---|---|---|---|---|---|
| 10 | = | = | Cutting walls and stairs, type of stairs, reinforcement details | = | = |
| 11 | = | = | Cutting walls and stairs, type of stairs, reinforcement details | = | = |
| 12 | = | = | Reinforced concrete slabs (types Panels: one-way tiles, two-way panels, flat panels, ribbed and hollow panels with all reinforcement details. | = | = |
| 13 | = | = | Reinforced concrete slabs (types Panels: one-way tiles, two-way panels, flat panels, ribbed and hollow panels with all reinforcement details. | = | = |
| 14 | = | = | Reinforced concrete slabs (types Panels: one-way tiles, two-way panels, flat panels, ribbed and hollow panels with all reinforcement details. | = | = |
| 15 | = | = | Semester test | = | = |
| 16 | = | = | An introduction to civil drawing and all applications in the engineering and industrial fields between the engineer and the worker Construction joints, types of joints, expansion joints, construction joints | = | = |
| 17 | = | = |  | = | = |
| 18 | = | = | Introduction to fixing steel drawing, steel column base plate connection Column links - coulombs | = | = |
| 19 | = | = | Prestressed concrete and water tanks. | = | = |
| 20 | = | = | = | = | = |
| 21 | = | = | Architectural details types of flooring | = | = |
| 22 | = | = | Surfaces and their materials. Finishing methods - | = | = |
| 23 | = | = | Doors and windows, types of doors And windows according to their uses. | = | = |
| 24 | = | = | Elevators | = | = |

| 25 | = | = | Municipal engineering drawing: water distribution systems Internal building water networks (cold and hot). Cold and hot), | = | = |
|---|---|---|---|---|---|
| | | | water treatment plant. | | |
| 26 | = | = | Drawing irrigation works, regulators, pipes, Siphon box bridges, dams, Bridges. | = | = |
| 27 | = | = | = | = | = |

## 11. Course Evaluation

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

## 12. Learning and Teaching Resources

| Required textbooks (curricular books, if any) | 1. Kreyszib, E. (2010). "Advanced Engineering Mathematics." John Wiley & Sons, USA, 3th edition. 2.Bronson, R.(2018). "Modern Introductory Differential Equations." McGraw-Hill, USA. |
|---|---|
| Main references (sources) | Numerical Analysis for Engineers Methods and Applications", $2^{th}$ Edition/Bilal M· Ayyub, and Richard H· |
| Recommended books and references (scientific journals, reports…) | Numerical Analysis for Engineers Methods and Applications", $2^{th}$ Edition/Bilal M· Ayyub, and Richard H· |
| Electronic References, Websites | Virtual Kingdom, Google, Facebook, You T |