

وصف البرنامج الاكاديمي

اسم الجامعة : جامعة العلوم العراقية

الكلية : كلية العلوم

القسم العلمي : علوم الامن السيبراني

اسم البرنامج الاكاديمي او المهني : بكالوريوس علوم الامن السيبراني

اسم الشهادة النهائية : بكالوريوس علوم في علوم الامن السيبراني

النظام الدراسي : نظام المقررات الدراسية

تاريخ اعداد الوصف : 1/12/2025

تاريخ ملء الملف : 1/12/2025

اللجنة المركزية لضمان الجودة لمسار بولونيا

التوقيع :

التوقيع :

التوقيع :

اسم رئيس اللجنة : د. م. كوثر محمود اسم العضو : د. ر. ناعبة الرحمن اسم العضو : د. م. نادية محمد

التوقيع :

التوقيع :

اسم العضو : أ. م. هادي نجم الدين اسم العضو : أ. د. صبحي ناصر

اللجنة الفرعية لضمان الجودة لمسار بولونيا

التوقيع :

التوقيع :

التوقيع :

اسم العضو : م. م. يسرى مارت اسم العضو : هادي نعيم

اسم رئيس اللجنة :

دقق الملف من قبل :

شعبة ضمان الجودة والاداء الجامعي

اسم مدير شعبة ضمان الجودة والاداء الجامعي :

التوقيع :

التاريخ :



جامعة العلوم العراقية
كلية العلوم
قسم علوم الامن السيبراني

وصف المواد الدراسية المرحلة الثانية

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

| Module Information | | | |
|------------------------------------|------------------------|-------------------------------|--|
| معلومات المادة الدراسية | | | |
| Module Title | DATA STRUCTURES | | Module Delivery يجب تحديد متطلبات المادة |
| Module Type | BASIC | | Theory Lecture Lab Tutorial Practical Seminar |
| Module Code | DAST212 | | |
| ECTS Credits | 5 | | |
| SWL (hr/sem) | 125 | | |
| Module Level | 2 | Semester of Delivery | |
| Administering Department | Type Dept. Code | College | Type College Code |
| Module Leader | Firas Mohammed abed | e-mail | faris1993@baghdadcollege.edu.iq |
| Module Leader's Acad. Title | | Module Leader's Qualification | |
| Module Tutor | | e-mail | |
| Peer Reviewer Name | Dr. Rana Abdulrhman | e-mail | taught.rana.abdalraan@baghdadcollege.edu.iq |
| Scientific Committee Approval Date | | Version Number | |

| Relation with other Modules | | | |
|-----------------------------------|----------------------------------|----------|------|
| العلاقة مع المواد الدراسية الأخرى | | | |
| Prerequisite module | None | Semester | None |
| Co-requisites module | Sorting and Searching Algorithms | Semester | 4 |

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

| | |
|--|---|
| Module Aims أهداف المادة الدراسية | <ul style="list-style-type: none"> • Getting to know the concept of data structures • Knowing the functions of data structures • Getting to know the applications of data structures |
| Module Learning Outcomes مخرجات التعلم للمادة الدراسية | <ol style="list-style-type: none"> 1-Understand the fundamental concepts of data structures and their importance in programming. 2-Learn about linear data structures, such as arrays, linked lists, stacks, and queues. 3-Study non-linear data structures, including trees (binary trees, binary search trees, AVL trees, etc.) and graphs. 4-Analyze the time and space complexities of various data structure operations. 5-Implement data structures using programming languages and apply them to solve real-world problems. 6-Learn about algorithms for searching, sorting, and traversing data structures. |
| Indicative Contents المحتويات الإرشادية | <p>Introduction of data structure, Type of data structure, Memory representation for D1 and D2, Linear list & types, Stack operations, Application of stack, Queue operations, Applications of Queue, Circular Queue, Linked list, Linked Stack, Linked Queue</p> |

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

| | |
|-------------------|---|
| Strategies | <p>Lectures (Theoretical and Practical)</p> <ol style="list-style-type: none"> 1-Enhance the student's ability to build programs 2-Develop these programs |
|-------------------|---|

Student Workload (SWL)

الحمل الدراسي للطالب موزع على (15) اسبوع

| | | | |
|--|-----|--|---|
| Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل | 78 | Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً | 5 |
| Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل | 47 | Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً | 3 |
| Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل | 125 | | |

Module Evaluation

تقييم المادة الدراسية

| | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
|----------------------|-----------------|-------------|------------------|------------|---------------------------|
| Formative assessment | Quizzes | 2 | 10% (10) | 5, 10 | LO #1, 2, 3 and 6 |
| | Assignments | 2 | 10% (10) | 2, 12 | LO # 3, 4, 5 and 6 |
| | Projects / Lab. | 1 | 10% (10) | Continuous | |
| | Report | 1 | 10% (10) | 13 | LO # 4, 5 and 6 |
| Summative assessment | Midterm Exam | 2 hr | 10% (10) | 7 | LO # 1-6 |
| | Final Exam | 2 hr | 50% (50) | 16 | All |
| Total assessment | | | 100% (100 Marks) | | |

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

| | Material Covered |
|---------|---|
| Week 1 | Introduction to Data Structures: - How to choose the suitable data structure - Types of data structures |
| Week 2 | Memory Representation - Introduction to Abstract Data Type |
| Week 3 | Stack The Stack Abstract Data Type - Array Stack - Stack Operations - Time Complexity of these operations |
| Week 4 | Applications of stack operations |
| Week 5 | The Queue Abstract Data Type - Queue operations - Time Complexity of operations |
| Week 6 | Circular Queue and Priority Queues: - The Abstract Data Type - Operations |
| Week 7 | Lists : - Array list - The array List Abstract Data Type |
| Week 8 | Lists : - Array list - The array List Abstract Data Type |
| Week 9 | Linked List - Storage Allocation - Pointers - Linked List Abstract Data Type |
| Week 10 | Traversing a Linked List - Linked List Operations |
| Week 11 | Linked List Design Modification : - Circular Linked List - Circular Linked List Operations |

| | |
|----------------|--|
| Week 12 | Traversing Circular Linked List |
| Week 13 | Linked List Design Modification : - Doubly Linked List - Doubly Linked List Operations |
| Week 14 | Linked Stack , Linked Queue , Linked Circular |
| Week 15 | Queue - Operations |
| Week 16 | Queue - Operations |

Delivery Plan (Weekly Tutorial)

المنهاج الاسبوعي الاضافي

| | Material Covered |
|---------------|--|
| Week1 | Applications of stack operations |
| Week2 | The Queue Abstract Data Type - Queue operations - Time Complexity of operations |
| Week3 | Circular Queue and Priority Queues: - The Abstract Data Type - Operations |
| Week4 | Lists : - Array list - The array List Abstract Data Type |
| Week5 | Lists : - Array list - The array List Abstract Data Type |
| Week6 | Linked List - Storage Allocation - Pointers - Linked List Abstract Data Type |
| Week7 | Traversing a Linked List - Linked List Operations |
| Week8 | Linked List Design Modification : - Circular Linked List - Circular Linked List Operations |
| Week9 | Traversing Circular Linked List |
| Week10 | Linked List Design Modification : - Doubly Linked List - Doubly Linked List Operations |
| Week11 | Linked Stack , Linked Queue , Linked Circular |
| Week12 | Queue |

| | |
|--|---------------------|
| | - Operations |
| Each week, a question sheet related to the material presented in the theoretical lecture will be solved and debated. | |

| Learning and Teaching Resources مصادر التعلم والتدريس | | |
|---|--|---------------------------|
| | Text | Available in the Library? |
| Required Texts | [1]: MICHAEL McMillan. Title : " Data Structures and Algorithms Using C#" , 2007 [2]: Thomas H. Cormen , CHARLES E. LEISERSON Title : "Introduction to Algorithms " , third edition ,2009 | Yes |
| Recommended Texts | Special requirements (include for example workshops, periodicals, IT software, websites) | No |
| Websites | | |

| Grading Scheme مخطط الدرجات | | | | |
|--|------------------|---------------------|-----------|---------------------------------------|
| Group | Grade | التقدير | Marks (%) | Definition |
| Success Group (50 - 100) | A - Excellent | امتياز | 90 - 100 | Outstanding Performance |
| | B - Very Good | جيد جدا | 80 - 89 | Above average with some errors |
| | C - Good | جيد | 70 - 79 | Sound work with notable errors |
| | D - Satisfactory | متوسط | 60 - 69 | Fair but with major shortcomings |
| | E - Sufficient | مقبول | 50 - 59 | Work meets minimum criteria |
| Fail Group (0 – 49) | FX – Fail | راسب (قيد المعالجة) | (45-49) | More work required but credit awarded |
| | F – Fail | راسب | (0-44) | Considerable amount of work required |
| Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. | | | | |

MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

| Module Information | | | |
|------------------------------------|------------------------|--|--|
| معلومات المادة الدراسية | | | |
| Module Title | Stream Cipher | Module Delivery | |
| Module Type | CORE | -Theory Lecture -Lab -PracticalSeminar | |
| Module Code | STCI214 | | |
| ECTS Credits | 6 | | |
| SWL (hr/sem) | 150 | | |
| Module Level | | Semester of Delivery | 1 |
| Administering Department | | College | |
| Module Leader | Zainab Mohammed Jameel | e-mail | zainabm99@baghdadcollege.edu.iq |
| Module Leader's Acad. Title | | Module Leader's Qualification | Masters |
| Module Tutor | None | e-mail | None |
| Peer Reviewer Name | | e-mail | taught.rana.abdallahman@baghdadcollege.edu.iq |
| Review Committee Approval | | Version Number | |

| Relation With Other Modules | | | |
|-----------------------------------|---------|-----------------|--|
| العلاقة مع المواد الدراسية الأخرى | | | |
| Prerequisite module | NUTH125 | Semester | |
| Co-requisites module | BLCI224 | Semester | |

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

| | |
|--|---|
| <p>Module Aims أهداف المادة الدراسية</p> | <ol style="list-style-type: none"> 1. The aim of this subject is to teach the students how to program the algorithm of stream cipher 2. The basic principle to encryption the cipher text. |
| <p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p> | <ol style="list-style-type: none"> 1. Understanding Cryptographic Fundamentals: <ul style="list-style-type: none"> . Explain the basic principles of cryptography, including the purpose and function of encryption and decryption. . Differentiate between symmetric and asymmetric encryption and identify where stream ciphers fit in this classification. 2. Stream Cipher Concepts: <ul style="list-style-type: none"> . Describe the key components and operation of stream ciphers, including keystream generation and XOR operation. . Explain the difference between synchronous and self-synchronizing stream ciphers. 3. Security Analysis: <ul style="list-style-type: none"> . Analyze the security properties of stream ciphers, including common vulnerabilities and attacks (e.g., keystream reuse, known-plaintext attacks). . Evaluate the robustness of different stream ciphers against various types of cryptographic attacks. 4. Implementation Skills: <ul style="list-style-type: none"> . Implement basic stream cipher algorithms in a programming language of choice (e.g., Python, C++). . Utilize cryptographic libraries to encrypt and decrypt data using stream ciphers. 5. Application and Use Cases: <ul style="list-style-type: none"> . Identify appropriate use cases for stream ciphers in real-world applications, such as securing data in transit or encrypting data streams. . Compare stream ciphers with block ciphers and determine the suitable use case for each type. 6. Performance Considerations: <ul style="list-style-type: none"> . Assess the performance characteristics of stream ciphers, including speed and resource consumption. . Optimize stream cipher implementations for efficiency in various environments, such as embedded systems or high-performance computing contexts. 7. Ethical and Legal Aspects: <ul style="list-style-type: none"> . Discuss ethical considerations in the use of cryptographic techniques, particularly in privacy and data protection. |
| <p>Indicative Contents المحتويات الإرشادية</p> | <ol style="list-style-type: none"> 1. Introduction 2. Fundamental Concepts 3. Key Components 4. Classical Stream Ciphers |

| | |
|--|--|
| | 5. Modern Stream Ciphers 6. Design Principles 7. Cryptanalysis of Stream Ciphers 8. Implementation 9. Applications 10. Case Studies 11. Future Trends and Research Directions |
| Learning and Teaching Strategies استراتيجيات التعلم والتعليم | |
| Strategies | The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students. |

| | | | |
|--|-----|--|--|
| Student Workload (SWL) الحمل الدراسي للطالب | | | |
| Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل | 93 | Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً | |
| Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل | 57 | Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً | |
| Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل | 150 | | |

| | | | | | |
|---|--------------------------------|--------------------|-----------------------|-----------------|----------------------------------|
| Module Evaluation تقييم المادة الدراسية | | | | | |
| | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
| Formative assessment | Quizzes | 1 | 10% (10) | 5 | LO # 1 and 3 |
| | Practical Seminar(Lab). | 2 | 15% (15) | Continuous | LO # 2 , 4 and 5 |
| Summative assessment | Midterm Exam | 1 hr | 15% (15) | 14 | LO # 1 to 5 |
| | Final Exam | 3hr | 60% (60) | 16 | All |
| Total assessment | | | 100% (100 Marks) | | |

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

| | Material Covered |
|---------|--|
| Week 1 | Introduction Stream Cipher Structure |
| Week 2 | Stream Cipher history |
| Week 3 | Important element for design a stream cipher |
| Week 4 | Types of stream ciphers |
| Week 5 | Polynomial Equations |
| Week 6 | Arithmetic of Polynomial |
| Week 7 | Shift register |
| Week 8 | Types of shift register |
| Week 9 | Review |
| Week 10 | Exam |
| Week 11 | linear Shift Register |
| Week 12 | Nonlinear Shift Register |
| Week 13 | Five Basic Tests |
| Week 14 | exam |
| Week 15 | Review and Exam |
| Week 16 | Final course Exam |

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي المختبر

| | Material Covered |
|---------|-------------------------------------|
| Week 1 | Program language V.B net |
| Week 2 | Program language V.B net |
| Week 3 | Program language V.B net |
| Week 4 | Program to stream cipher |
| Week 5 | Program to Polynomial |
| Week 6 | Program to Arithmetic of Polynomial |
| Week 7 | Program to Shift register |
| Week 8 | Counties program to SR |
| Week 9 | review |
| Week 10 | linear Shift Register program |

| | |
|---------|----------------------------------|
| Week 11 | Nonlinear Shift Register program |
| Week 12 | Five Basic Tests program |
| Week 13 | Counties |

| Learning and Teaching Resources | | |
|---------------------------------|---|---------------------------|
| مصادر التعلم والتدريس | | |
| | Text | Available in the Library? |
| Required Texts | H. Boker & F. Piper, "Cipher System, The Protection of Communications ", Northwood Books, Landon, 1982. | Yes |
| Recommended Texts | <p>B. Schneier, "Applied Cryptography", 2nd ed., John Wiley & Sons, Inc., 1996.</p> <p>ANSI X9.44, "Public key cryptography using reversible algorithms for the financial services industry: Transport of symmetric algorithm keys using RSA", 1994.</p> <p>Diffie: Whitfield Diffie and Martin Hellman, "New Directions in Cryptography", IEEE Transactions on Information Theory, Nov 1976.</p> <p>William, S., " <i>Cryptography and Network Security: Principles and Practice.</i> ", Three Edition. Prentice Hall, 2002.</p> | No |
| Websites | | |

APPENDIX:

| GRADING SCHEME | | | | |
|-----------------------------|------------------|-------------|-----------|---------------------------------------|
| مخطط الدرجات | | | | |
| Group | Grade | التقدير | Marks (%) | Definition |
| Success Group (50 - 100) | A - Excellent | امتياز | 90 - 100 | Outstanding Performance |
| | B - Very Good | جيد جدا | 80 - 89 | Above average with some errors |
| | C - Good | جيد | 70 - 79 | Sound work with notable errors |
| | D - Satisfactory | متوسط | 60 - 69 | Fair but with major shortcomings |
| | E - Sufficient | مقبول | 50 - 59 | Work meets minimum criteria |
| Fail Group (0 - 49) | FX – Fail | مقبول بقرار | (45-49) | More work required but credit awarded |
| | F – Fail | راسب | (0-44) | Considerable amount of work required |
| Note: | | | | |

NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

| Module Information | | | |
|------------------------------------|-----------------------------------|-------------------------------|--|
| معلومات المادة الدراسية | | | |
| Module Title | NUMERICAL ANALYSIS | | Module Delivery يجب تحديد متطلبات المادة |
| Module Type | BASIC | | <ul style="list-style-type: none"> - Theory Lecture - Lab - Practical Seminar |
| Module Code | NUAN213 | | |
| ECTS Credits | 5 | | |
| SWL (hr/sem) | 125 | | |
| Module Level | 2 | Semester of Delivery | 3 |
| Administering Department | Cyber Security Science Department | College | Baghdad College of Economic Sciences University |
| Module Leader | Lect. Alaa Abdulwahid | e-mail | alaa1973@baghdadcollege.edu.iq |
| Module Leader's Acad. Title | Lecturer | Module Leader's Qualification | |
| Module Tutor | Lect. Alaa Abdulwahid | e-mail | alaa1973@baghdadcollege.edu.iq |
| Peer Reviewer Name | | e-mail | |
| Scientific Committee Approval Date | | Version Number | |

| Relation with other Modules | | | |
|-----------------------------------|---------|----------|---|
| العلاقة مع المواد الدراسية الأخرى | | | |
| Prerequisite module | MATH112 | Semester | 1 |
| Co-requisites module | None | Semester | 3 |

| Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| Module Aims أهداف المادة الدراسية | <ol style="list-style-type: none"> 1. Explain and apply various numerical methods for mathematical problem-solving. 2. Implement numerical algorithms using MATLAB for solving mathematical problems. 3. Analyze and quantify errors associated with numerical methods. 4. Apply numerical techniques to solve real-world engineering and scientific problems. 5. Communicate results effectively, both orally and in writing. |
| Module Learning Outcomes مخرجات التعلم للمادة الدراسية | <ol style="list-style-type: none"> 1. Understand and explain fundamental numerical methods. 2. Implement numerical algorithms using MATLAB. 3. Analyze and control errors in numerical computations. 4. Apply numerical techniques to solve engineering and scientific problems. 5. Communicate results of numerical analyses clearly and effectively. |
| Indicative Contents المحتويات الإرشادية | <ol style="list-style-type: none"> 1- Introduction to Numerical Methods 2- Error Analysis and Computer Arithmetic 3- Solutions of Equations in One Variable 4- Interpolation and Polynomial Approximation 5- Numerical Differentiation and Integration 6- Numerical Solution of Initial Value Problems for Ordinary Differential Equations 7- Direct Methods for Solving Linear Systems 8- Iterative Techniques in Matrix Algebra 9- Approximation Theory and Least Squares Approximation 10- Approximation of Eigenvalues and Eigenvectors 11- Numerical Solution of Boundary Value Problems for Ordinary Differential Equations 12- Finite Difference Methods for Boundary Value Problems 13- Numerical Solution of Partial Differential Equations 14- Introduction to MATLAB for Numerical Analysis 15- These contents typically cover a wide range of numerical methods and algorithms commonly used in mathematical and computational applications. |

| Learning and Teaching Strategies استراتيجيات التعلم والتعليم | |
|--|--|
| Strategies | <p>The learning outcomes for a Numerical Analysis course include:</p> <ol style="list-style-type: none"> 1. Understanding and implementing numerical methods for solving mathematical problems, such as root finding, interpolation, and approximation of functions. 2. Analyzing the properties of numerical algorithms including convergence, stability, and accuracy. 3. Applying numerical techniques to solve practical engineering and scientific problems, such as differential equations, optimization, and |

| | |
|--|--|
| | linear algebraic equations. 4. Developing proficiency in programming and utilizing computational tools like MATLAB, Python, or numerical computation software to implement algorithms and analyze numerical solutions. 5. Critically evaluating the results obtained from numerical methods, including error analysis and comparing with analytical solutions where possible. 6. Exploring advanced topics in numerical analysis, such as finite element methods, numerical integration, and solving eigenvalue problems. |
|--|--|

| Student Workload (SWL) الحمل الدراسي للطالب موزع على (15) أسبوع | | | |
|--|-----|--|-----|
| Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل | 78 | Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً | 5 |
| Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل | 47 | Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً | 5.7 |
| Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل | 125 | | |

| Module Evaluation تقييم المادة الدراسية | | | | | |
|---|-------------------------|-------------|------------------|------------|---------------------------|
| | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
| Formative assessment | Quizzes | 1 | 10% (10) | 5 | LO #1 and 3 |
| | Practical Seminar(Lab). | 2 | 15% (15) | Continuous | LO #2, 4 and 5 |
| Summative assessment | Midterm Exam | 1hr | 15% (15) | 14 | LO #1 to 5 |
| | Final Exam | 3hr | 60% (60) | 16 | All |
| Total assessment | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري | |
|---|--|
| | Material Covered |
| Week 1 | Introduction to numerical analysis+ Solution of non-linear equations, Newton Raphson method for approximating, Lagrange approximation |
| Week 2 | Numerical differentiation and numerical integration, The Solutions of Integral equations, Trapezoidal method Simpsons method |
| Week 3 | Simpsons method(3/8) |

| | |
|---------|---|
| Week 4 | numerical differentiation, Euler method, modified Euler method |
| Week 5 | Rung Kutta method, Rung Kutta-merson method |
| Week 6 | Introduction and solution of Partial differential equations |
| Week 7 | Formation of Partial differential equations And solution of separable first order |
| Week 8 | Types of partial differential equations, wave equation, heat equation |
| Week 9 | Solution sys of linear equation, Elimination and iterative methods |
| Week 10 | Solution sys of linear eq by Cramer's rule, solve by inverse matri |
| Week 11 | Method of least square |
| Week 12 | introduction to Fourier series |
| Week 13 | Fourier series for odd and even functions, Half range Fourier series |
| Week 14 | Change of interval Fourier series |
| Week 15 | Mid Term Exam and Preparatory Week |
| Week 16 | Final Exam |

Delivery Plan (Weekly Tutorial)

المنهاج الاسبوعي الإضافي

| Delivery Plan (Weekly Lab. Syllabus) | Material Covered |
|--|---|
| Week 1 | Introduction to MATLAB for numerical computations |
| Week 2 | Solving linear systems of equations in matlab |
| Week 3 | Interpolation and curve fitting |
| Week 4 | Numerical differentiation and integration |
| Week 5 | Solution of nonlinear equations |
| Week 6 | Numerical solutions of ordinary differential equations (ODEs) |
| Week 7 | Finite difference methods |
| Week 8 | Numerical solutions of partial differential equations (PDEs) |
| Week 9 | Optimization techniques, Error Analysis in Numerical Computations |
| Week 10 | MATLAB programming for numerical analysis |
| Week 11 | Simple introduction about using matlab program |
| Week 12 | Vectors in matlab prog. |
| Week 13 | Matrix in matlab prog. |
| Week 14 | Application of numerical analysis in matlab |
| Week 15 | Exam |

Learning and Teaching Resources

مصادر التعلم والتدريس

| | Text | Available in the Library? |
|----------------|---|------------------------------|
| Required Texts | Thomas, G. Calculus and Analytic Geometry, Fifth Edition, Addition Wesley, 1999 | No |

| | | |
|-------------------|---|----|
| Recommended Texts | 1. matlab programming language. | No |
| Websites | Any sources take in lectures and examples | |

| Grading Scheme | | | | |
|--|------------------|---------------------|-----------|---------------------------------------|
| مخطط الدرجات | | | | |
| Group | Grade | التقدير | Marks (%) | Definition |
| Success Group (50 - 100) | A - Excellent | امتياز | 90 - 100 | Outstanding Performance |
| | B - Very Good | جيد جدا | 80 - 89 | Above average with some errors |
| | C - Good | جيد | 70 - 79 | Sound work with notable errors |
| | D - Satisfactory | متوسط | 60 - 69 | Fair but with major shortcomings |
| | E - Sufficient | مقبول | 50 - 59 | Work meets minimum criteria |
| Fail Group (0 – 49) | FX – Fail | راسب (قيد المعالجة) | (45-49) | More work required but credit awarded |
| | F – Fail | راسب | (0-44) | Considerable amount of work required |
| Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. | | | | |

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

| Module Information | | | |
|------------------------------------|-----------------------------|-------------------------------|---|
| معلومات المادة الدراسية | | | |
| Module Title | OBJECT ORIENTED PROGRAMMING | | Module Delivery يجب تحديد متطلبات المادة |
| Module Type | BASIC | | <input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar |
| Module Code | OBOP211 | | |
| ECTS Credits | 8 | | |
| SWL (hr/sem) | 200 | | |
| Module Level | 2 | Semester of Delivery | |
| Administering Department | | College | BCoESU |
| Module Leader | Anwar Basim | e-mail | anwar97basim@baghdadcollege.edu.iq |
| Module Leader's Acad. Title | Lecturer | Module Leader's Qualification | Msc |
| Module Tutor | Dr. Rana abdalrahman | e-mail | taught.rana.abdalrahman@baghdadcollege.edu.iq |
| Peer Reviewer Name | | e-mail | |
| Scientific Committee Approval Date | | Version Number | |

| Relation with other Modules | | | |
|-----------------------------------|------------------------|----------|---|
| العلاقة مع المواد الدراسية الأخرى | | | |
| Prerequisite module | STRUCTURED PROGRAMMING | Semester | 2 |
| Co-requisites module | | Semester | |

| Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|--|
| Module Aims أهداف المادة الدراسية | <ol style="list-style-type: none"> 1. Teaching the students the concept of the functions and how to call and passing values to them, Function Overloading and Inline function concepts. 2. Studying the Basic of Object Oriented Programming (OOP) and its features (Encapsulation, Inheritance, Polymorphism) 3. Teaching students Constructor and Destructors ,Friend Function and Friend Classes Constant Member Functions and Constant Objects ,Static Data Member and Static Function, Pointer to Objects and Array of Objects 4. Teaching students Operator Overloading (Unary and Binary Operator Overloading). 5. Teaching students Inheritance Feature with its types 6. Teaching students Polymorphism Feature with virtual functions 7. Teaching students Function Template and class Template |
| Module Learning Outcomes مخرجات التعلم للمادة الدراسية | <ol style="list-style-type: none"> 1. Perform Functions Concepts such as passing parameters, Overloading and Inline. 2. Understanding the Concept of Object Oriented Programming: Object and Class, 3. Understanding the meaning of Constructor and Destructors. 4. Understanding the meaning of Friend Function and Friend 5. Perform Classes Constant Member Functions and Constant Objects, Static Data Member and Static Function. 6. Understanding the concept of Unary and Binary Operators Overloading 7. Learn how to deal with types of Inheritances Single , Hierarchical ,Multilevel, and Multiple Inheritances 8. Capable of using Polymorphism and Dynamic Binding 9. Give the student the ability of using Function Template and class Template |
| Indicative Contents المحتويات الإرشادية | <ol style="list-style-type: none"> 1- Explain how to define Overloading and Inline functions, objects with encapsulation data, Constructor and Destructors functions. 2- Explain how to use Operators Overloading, with various types and types of Inheritances 3- Let the students see many examples about Polymorphism and Template |
| Learning and Teaching Strategies استراتيجيات التعلم والتعليم | |
| Strategies | The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time |

| | |
|--|--|
| | refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students. |
|--|--|

| Student Workload (SWL) الحمل الدراسي للطالب موزع على (15) اسبوع | | | |
|--|-----|--|-----|
| Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل | 108 | Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً | 7 |
| Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل | 92 | Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً | 5.7 |
| Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل | 200 | | |

| Module Evaluation تقييم المادة الدراسية | | | | | |
|---|-----------------|-------------|----------------|------------|---------------------------|
| | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
| Formative assessment | Quizzes | 1 | 10% | 5 | LO # 1 and 3 |
| | Projects / Lab. | 2 | 10% | Continuous | LO # 2 , 4 and 5 |
| | Report | 1 | 10% | Continuous | LO # 2 , 4 and 5 |
| Summative assessment | Midterm Exam | 1 h | 10% | 14 | LO # 1 to 5 |
| | Final Exam | 3 h | 60% | 16 | ALL |
| Total assessment | | | 100% | | |

| Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري | |
|---|---|
| | Material Covered |
| Week 1 | Overview for functions <ul style="list-style-type: none"> • General Format of a Function Definition , Local and Global Variables • Inline Function and Function Overloading • Passing parameters , by value and by Reference and Default Argument |
| Week 2 | Overview of OOP <ul style="list-style-type: none"> • Encapsulation and Data Hiding , Inheritance and Reuse and Polymorphism • Class Definition |
| Week 3 | Constructor and Destructors |
| Week 4 | Friend Function |
| Week 5 | Friend Class |
| Week 6 | Scope Operator Resolution |

| | |
|----------------|--|
| | Member Initialization List Constant member <ul style="list-style-type: none"> • Constant Function Argument and Constant Member Functions Static Members |
| Week 7 | Objects Pointers <ul style="list-style-type: none"> • This pointer and <i>References Members</i> • <i>Class Object Member</i> |
| Week 8 | Arrays as Class Data Member <ul style="list-style-type: none"> • Object Arrays • An Array of Pointers to Objects |
| Week 9 | Operator Overloading <ul style="list-style-type: none"> • Overloading Unary Operators • Operator Arguments ,Operator Return Values and Postfix Notation |
| Week 10 | Overloading Binary Operators <ul style="list-style-type: none"> • Arithmetic Operators • Comparison Operators |
| Week 11 | Inheritance <ul style="list-style-type: none"> • Derived Class and Base Class ,Accessing Base Class Members • The protected Access Specifier and Dangers of protected • Overriding Member Functions |
| Week 12 | Class Hierarchies <ul style="list-style-type: none"> • “Abstract” Base Class , Access Combinations and Levels of Inheritance • Multiple Inheritances and Ambiguity in Multiple Inheritances |
| Week 13 | Virtual Functions Polymorphism <ul style="list-style-type: none"> • Polymorphism of Variables • Polymorphism of Functions • Polymorphism of Objects Normal Member Functions Accessed with Pointers Virtual Member Functions Accessed with Pointers Abstract Classes and Pure Virtual Functions Virtual Base Classes |
| Week 14 | Templates <ul style="list-style-type: none"> • Function Template and Simple Function Template • Class Template |
| Week 15 | Final Exam |

Delivery Plan (Weekly Lab. Syllabus)

| | |
|--|-------------------------|
| | Material Covered |
| Each week, a question sheet related to the material presented in the theoretical lecture will be solved and debated. | |
| Material Covered | |
| Week 1 | |
| Overview for functions | |

- Function Definition , Local and Global Variables, Inline Function and Function Overloading, Passing parameters , by value and by Reference and Default Argument

Week 2

Overview of OOP

- Class Definition

Week 3

Constructor and Destructors

Week 4

Friend Function

Week 5

Friend Class

Week 6

Scope Operator Resolution

Member Initialization List

Constant member

- Constant Function Argument and Constant Member Functions

Static Members

Week 7

Objects Pointers

- This pointer and References Members and Class Object Member

Week 8

Arrays as Class Data Member

- Object Arrays and an Array of Pointers to Objects

Week 9

Operator Overloading

- Overloading Unary Operators and Arguments , Return Values and Postfix Notation

Week 10

Overloading Binary Operators

- Arithmetic Operators and Comparison Operators

Week 11

Inheritance

- Derived Class and Base Class , Accessing Base Members and Overriding Member functions

Week 12

Class Hierarchies

- “Abstract” Base Class , Access Combinations and Levels of Inheritance
- Multiple Inheritances and Ambiguity in Multiple Inheritances

Week 13

Virtual Functions

Polymorphism

- Polymorphism of Variables , Polymorphism of Functions, Polymorphism of Objects
- #### **Normal and Virtual Member Functions Accessed with Pointers, Pure Virtual Functions**

Week 14

Templates

- Function Template with Simple Function Template and Class Template

Week 15

Final Exam

| مصادر التعلم والتدريس | | |
|-----------------------|---|---------------------------|
| | Text | Available in the Library? |
| Required Texts | Joyce Farrell, "Object-Oriented Programming Using C++", Fourth Edition, Course Technology, 2009. | No |
| Recommended Texts | Bjarne Stroustrup, "Programming Principles and Practice Using C++", Second Edition, Addison-Wesley, 2014. | NO |
| Websites | | |

| Grading Scheme | | | | |
|---|------------------|---------------------|-----------|---------------------------------------|
| مخطط الدرجات | | | | |
| Group | Grade | التقدير | Marks (%) | Definition |
| Success Group (50 - 100) | A - Excellent | امتياز | 90 - 100 | Outstanding Performance |
| | B - Very Good | جيد جدا | 80 - 89 | Above average with some errors |
| | C - Good | جيد | 70 - 79 | Sound work with notable errors |
| | D - Satisfactory | متوسط | 60 - 69 | Fair but with major shortcomings |
| | E - Sufficient | مقبول | 50 - 59 | Work meets minimum criteria |
| Fail Group (0 - 49) | FX – Fail | راسب (قيد المعالجة) | (45-49) | More work required but credit awarded |
| | F – Fail | راسب | (0-44) | Considerable amount of work required |
| | | | | |
| <p>Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.</p> | | | | |

Course Description Form

| | | | |
|--|---|--|-------------------|
| 1. Course Name: Authentication and Access Control | | | |
| | | | |
| 2. Course Code: CSCS4221 | | | |
| | | | |
| 3. Semester / Year: 2nd course \ 2026-2025 | | | |
| | | | |
| 4. Description Preparation Date: Jan/2025 | | | |
| | | | |
| 5. Available Attendance Forms: Presence in the Class | | | |
| | | | |
| 6. Number of Credit Hours (Total) / 30 hours/ 2 units | | | |
| | | | |
| 7. Course administrator's name (mention all, if more than one name) | | | |
| <table style="width: 100%; border: none;"> <tr> <td style="width: 60%; border: none;">faris1993@baghdadcollege.edu.iq</td> <td style="width: 40%; border: none; text-align: right;">م.م فارس محمد عبد</td> </tr> </table> | | faris1993@baghdadcollege.edu.iq | م.م فارس محمد عبد |
| faris1993@baghdadcollege.edu.iq | م.م فارس محمد عبد | | |
| <p>reviewer name Dr. Rana Abdalrahman taught.rana.abdalrahman@baghdadcollege.edu.iq</p> | | | |
| 8. Course Objectives | | | |
| Course Objectives | <ul style="list-style-type: none"> Students can explain what it means to verify someone's identity compare how verification works in different situations. Students can describe how and why a username and password combinat is used for authentication. Students can summarize some high-level weaknesses to using shared secret authenticate to a website or computer | | |
| 9. Teaching and Learning Strategies | | | |
| Strategy | Methodological books, resources (internet and library), dialogues reinforced w illustrative examples, Theoretical lectures, laboratory laboratories, practical tasks, u modern devices to present practical ideas to students (data show, electronic board) | | |
| | | | |

10· Course Structure

| Week | Hours | ILOs | Unit/Module or Topic Title | Teaching Method | Assessment Method |
|-------------|--------------|-------------|---|------------------------|--|
| 1 | 2 hours | 1,3,5 | Define the Authentication, Authentication goals, Authentication requirements | class | Attendance + answer discussion questions |
| 2 | 2 hours | 1,3,5 | Human Authentication, Machine authentication , Authentication technologies | class | Attendance + answer discussion questions |
| 3 | 2 hours | 1,3,5 | Remote User Authentication Principles ,Remote User Authentication Using Symmetric Encryption | class | Attendance + answer discussion questions |
| 4 | 2 hours | 1,3,5 | Define Access control, Access control required tools | class | Attendance + answer discussion questions |
| 5 | 2 hours | 1,3,5 | Identification, Authentication, Authorization | class | Attendance + answer discussion questions |
| 6 | 2 hours | 1,3,5 | Fingerprints , Retina scan, Iris scan, Voice print , Facial scan process, Biometric performance | class | Attendance + answer discussion questions |
| 7 | 2 hours | 1,3,5 | Mid Exam | class | Attendance + answer discussion questions |
| 8 | 2 hours | 1,3,5 | Types of Access control, Administrative control, Technical control | class | Attendance + answer discussion questions |
| 9 | 2 hours | 1,3,5 | Technical control, Physical control, Categories of access control | class | Attendance + Assignment |
| 10 | 2 hours | 1,3,5 | Access Control Matrix , ACLs and Capabilities | class | Attendance + answer discussion questions |
| 11 | 2 hours | 1,3,5 | Confused Deputy , Multilevel Security Models | class | Attendance + Homework |

| | | | | | |
|----|---------|-------|------------------------------------|-------|--|
| 12 | 2 hours | 1,3,5 | Bell-LaPadula , Biba's Model | class | Attendance + answer discussion questions |
| 13 | 2 hours | 1,3,5 | Covert Channel , Inference Control | class | Attendance + answer discussion questions |
| 14 | 2 hours | 1,3,5 | Introduction to CAPTCHA | class | Attendance + Assignment |
| 15 | 2 hours | 1,3,5 | Exam | | Scores |

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 (curric books, if any) | <ul style="list-style-type: none"> • Cryptography and Network Security Principles and Pract FifthEdition,William stallings • https://www.chipsystems.in/download_syllabus.php?sbs=QURBQIQucGRm • INFORMATION SECURITYPRINCIPLESANDPRACTICE, M Stamp,San Jose State University,2006 |
| Main references (sources) | <ul style="list-style-type: none"> • INFORMATION SECURITYPRINCIPLESANDPRACTICE, Mark Stamp,San Jose State University,2006 |
| Recommended books and references (scientific journals, reports...) | <ul style="list-style-type: none"> • INFORMATION SECURITYPRINCIPLESANDPRACTICE, Mark Stamp,San Jose State University,2006 |
| Electronic Websites | Referenc Internet websites |

