MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

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| **Module Information**  **معلومات المادة الدراسية** | | | | | | | |
| **Module Title** | Programming Essentials | | | | **Module Delivery** | | |
| **Module Type** | Core | | | | * **☒ Theory** * **☐ Lecture** * **☒ Lab** * **☐ Tutorial** * **☐ Practical** * **☐ Seminar** | | |
| **Module Code** | **CET1203** | | | |
| **ECTS Credits** | 6 | | | |
| **SWL (hr/sem)** | 150 | | | |
| **Module Level** | | UGx11 1 | **Semester of Delivery** | | | | 2 |
| **Administering Department** | | CET | **College** | EETC | | | |
| **Module Leader** | Dr. Loay Al-Saffar | | **e-mail** | Loay.alsaffar@mtu.edu.iq | | | |
| **Module Leader’s Acad. Title** | | Lecturer | **Module Leader’s Qualification** | | | | Ph.D. |
| **Module Tutor** | Dr. Hisham Raad Jafer | | **e-mail** | hisham.merzeh@mtu.edu.iq | | | |
| **Peer Reviewer Name** | | Dr. Osama Abbas Hussein | **e-mail** | osama.abbas@mtu.edu.iq | | | |
| **Scientific Committee Approval Date** | | 29/10/2023 | **Version Number** | | | 1.0 | |

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

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| **Module Aims, Learning Outcomes and Indicative Contents**  **أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية** | |
| **Module Aims**  **أهداف المادة الدراسية** | 1. To develop problem solving skills and understanding of programming principles. 2. To understand the logic behind programming. 3. This course include using C++ as a programming language. 4. This course include algorithm design. 5. To understand how a programmer should prepare his work and think logically. 6. To perform programming project using control statements, functions, and to deal with the data stored in an array or file. |
| **Module Learning Outcomes**  **مخرجات التعلم للمادة الدراسية** | 1. Use of algorithms (Flowchart specifically). 2. Explain how the program is written using C++ Programming language. 3. Define and use of variables (Data types, Declaration of variables). 4. Use of operators and its precedence (Assignment, Arithmetic operators, Relational and Logical operators, Bitwise Operators, Increment and decrement, Cast operator, and Conditional operator). 5. Making Decisions (use of: if, if-else, and switch statements) and draw of Flowchart of if-else statement. 6. Use of Loops (for, while, do-while), and use of break and continue statements with loops, and draw of Flowchart of loops. 7. Use of Arrays (one and two dimensional). 8. Use of Functions (Built-in function functions (Library functions), and User-Defined functions). 9. Use of arguments passed by value and by reference, and use of Local and global variables. 10. Use of Character sequences and string handling. 11. Handling and processing text files in C++. |
| **Indicative Contents**  **المحتويات الإرشادية** | Indicative content includes the following.  - -Introduction to computers and programming. Types of programs (Applications and Systems). Programming languages (Machine, Assembly, and High-level language). Introduction to Compilers, Interpreters, object file, and executable file.  Introduction to C++ with a simple program implementation. Types of programming errors, Program development life cycle, Algorithms - Flowchart - .  Header files, Standard Input/output instructions, Comments in C++. **[15 hrs]**  -- Variables, Data Types, Declaration of variables, Constants, Statements.  Operators (Assignment, Arithmetic operators, Relational and Logical operators, Bitwise Operators, Increment and decrement, Cast operator, and Conditional operator), Precedence of operators. **[5 hrs]**  -- Making Decisions (if, if-else statements), Flowchart of if-else statement. Making Decisions (switch statement), using break statement with switch statement, Flowchart of switch statement. Loops (for, while, do-while), using break and continue statements with loops, Flowchart of loops. **[10 hrs]**  - -Arrays (One dimensional and Two Dimensional**) [5 hrs]**  -- Functions (Built-in function functions (Library functions), and User-Defined functions), Function prototype (Declaration), Function call, Passing arguments to a function, return statement, Value-Returning vs. Void (Non Value Returning) functions, Function with no argument and no return value, Function with no argument but return value, Function with argument but no return value, Function with argument and return value. Arguments passed by value and by reference, Recursion, Local and global variables. **[15 hrs]**  -- Character sequences and string handling, ASCII table. **[5 hrs]**  - -Handling and processing text files in C++ **[5 hrs]** |

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| **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 learning and developing their skills in programming and logic thinking, 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 lab experiments involving assignments and project design activities that are interesting to the students. |

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| **Student Workload (SWL)**  **الحمل الدراسي للطالب** | | | |
| **Structured SWL (h/sem)**  **الحمل الدراسي المنتظم للطالب خلال الفصل** | 64 | **Structured SWL (h/w)**  **الحمل الدراسي المنتظم للطالب أسبوعيا** | 4.26 |
| **Unstructured SWL (h/sem)**  **الحمل الدراسي غير المنتظم للطالب خلال الفصل** | 86 | **Unstructured SWL (h/w)**  **الحمل الدراسي غير المنتظم للطالب أسبوعيا** | 5.73 |
| **Total SWL (h/sem)**  **الحمل الدراسي الكلي للطالب خلال الفصل** | 150 | | |

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| **Module Evaluation**  **تقييم المادة الدراسية** | | | | | |
| **As** | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 1 | 10% (10) | 6 | LO #1- 6 |
| **Assignments** | 1 | 10% (10) | Continuous | LO #1-10 |
| **Projects / Lab.** | 1 | 10% (10) | Continuous | LO #1-11 |
| **Report** | 1 | 5% (10) | Continuous | LO #1, 11 |
| **Summative assessment** | **Midterm Exam** | 2 hr | 10% (10) | 7 | LO # 1 to 7 |
| **Final Exam** | 4hr | 50% (50) | 15 | All |
| **Total assessment** | | | 100% (100 Marks) |  |  |

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| **Delivery Plan (Weekly Syllabus)**  **المنهاج الأسبوعي النظري** | |
| **Week** | **Material Covered** |
| **Week 1** | Introduction (History of computers). Types of programs (Applications and Systems). Programming languages (Machine, Assembly, and High-level language). |
| **Week 2** | Introduction to Compilers, Interpreters, object file, and executable file. Types of programming errors, program development life cycle. |
| **Week 3** | Algorithms (Flowchart). |
| **Week 4** | Variables, Data Types, Declaration of variables, Constants, Statements, and Operators. |
| **Week 5** | Making Decisions (if, if-else statements), flowchart of if-else statement. |
| **Week 6** | Making Decisions (switch statement), using break statement with switch statement, flowchart of switch statement. |
| **Week 7** | Mid-term Exam |
| **Week 8** | Loops (while, do-while), using break and continue statements with loops, flowchart of loops. |
| **Week 9** | Arrays (One dimensional) |
| **Week 10** | Arrays (Two Dimensional) |
| **Week 11** | Functions: Built-in function functions (Library functions), and User-Defined functions),  Function prototype (Declaration), function call, Passing arguments to a function, return statement, Local and global variables. |
| **Week 12** | Functions (Value-Returning) vs. Void (Non Value Returning) functions, function with no argument and no return value, function with no argument but return value, function with argument but no return value, function with argument and return value.  Arguments passed by value and by reference. |
| **Week 13** | Character sequences and string handling, ASCII table. |
| **Week 14** | Handling and processing text files in C++ |
| **Week 15** | **Preparatory week before the final Exam** |

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| **Delivery Plan (Weekly Lab. Syllabus)**  **المنهاج الأسبوعي للمختبر** | |
| **Week** | **Material Covered** |
| **Week 1** | Lab 1: Introduction to C++ with a simple program implementation. Header files, Standard Input/output instructions, Comments in C++. |
| **Week 2** | Lab 2: Variables and Operators (Assignment, Arithmetic operators, Relational and Logical operators, Bitwise Operators, Increment and decrement, Cast operator, and Conditional operator), Precedence of operators. |
| **Week 3** | Lab 3: Making Decisions (if, if-else). |
| **Week 4** | Lab 4: Making Decisions (switch statements). |
| **Week 5** | Lab 5: Loops (for) |
| **Week 6** | Lab 6: Loops (while, and do-while) |
| **Week 7** | Lab 7: Arrays (1D) |
| **Week 8** | Lab 8: Arrays (2D) |
| **Week 9** | Lab 9: Functions |
| **Week 10** | Lab 10: Function types according to whether it take arguments and/or return a value or not. |
| **Week 11** | Lab 11: Character sequences and string handling. |
| **Week 12** | Lab 12: Text files |

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| **Learning and Teaching Resources**  **مصادر التعلم والتدريس** | | |
|  | **Text** | **Available in the Library?** |
| **Required Texts** | C++ How to Program, 6th Edition 2007 By P. J. Deitel - Deitel & Associates, Inc., H. M. Deitel - Deitel & Associates, Inc. | Yes |
| **Recommended Texts** | Starting Out with Programming Logic and Design (What's New in Computer Science), 5th Edition 2018  By Tony Gaddis | No |
| **Websites** | https://www.geeksforgeeks.org/c-plus-plus | |

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| **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 |
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| **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. | | | | |