

**Course: Advanced Programming (1941215)**

**Prerequisite: Computer Skills-2 (1901102)**

**Lecturers:**

Name	Office	Office Hours	E-mail
Dr. Sherinaz AlHajBaddar	KASIT 1 <sup>st</sup> floor		
Dr. Jamal Alsakran	KASIT 1 <sup>st</sup> floor		
Mr. Nabeel Alassaf	KASIT 1 <sup>st</sup> floor		
Mrs. Lubna Naser Eddeen	KASIT 1 <sup>st</sup> floor		
Mrs. Ansar Khoury	KASIT 1 <sup>st</sup> floor		

**Description**

A deeper look into C++ programming. Advanced topics include pointers and string memory management (dynamic memory allocation), object oriented design, classes and data abstraction, operator overloading, inheritance, virtual functions and polymorphism, and templates. Other topics are exception handling, file processing, standard template library, detailed bits and strings operations, and the pre-processor, I/O streams.

**Intended Learning Outcomes:**

Successful completion of this course should lead to the following learning outcomes:

**A Knowledge and understanding: Students should**

Understand basic concepts of object oriented programming, classes and inheritance, pointers and memory management.

**B Intellectual skills: with the ability to**

- B1) Comparison between object oriented and structural programming.
- B2) Comparison between dynamic and static memory allocation.
- B3) Recognition main concepts of data abstraction and polymorphism.

**C Subject specific skills: with ability to**

- C1) Build and write a complete C++ program with proper use of classes and objects.
- C2) Deal with memory and memory variables allocated statically or dynamically.
- C3) Using standard template library (STL).
- C4) Deal with bits and performing bit operations.

**D Transferable skills: with ability to**

Work in a group in order to implement specific subject using C++ programming language and object oriented techniques, and be able to present the final work and make a demo.

**Teaching Methods:**

Method	Lecture	Assignments	Projects
Learning outcome	A,(B1-B3)	(B1-B3),(C1-C4)	D
Assessment	Exams + Assignment + Quizzes	Assignment evaluation + Quizzes	Project discussion and presentation

**Course Contents:**

Chapters	Period
<b>Chapter 9: Records (Structs)</b> <ul style="list-style-type: none"> <li>- Accessing struct Members</li> <li>- Assignment.</li> <li>- Comparison (Relational Operators)</li> <li>- Input/Output</li> <li>- Struct variables and functions</li> <li>- Array versus structs</li> <li>- Arrays in structs.</li> <li>- Structs in arrays</li> <li>- Structs within a struct</li> </ul>	3 hours
<b>Chapter 10: Classes and data abstraction</b> <ul style="list-style-type: none"> <li>- Variable (object) declaration</li> <li>- Accessing class members.</li> <li>- Built-in operations on classes</li> <li>- Assignment operators and classes</li> <li>- Class scope</li> <li>- Functions and classes</li> <li>- Reference parameters and class objects</li> <li>- Implementation of member functions</li> <li>- Constructors and destructor</li> <li>- Arrays of objects</li> <li>- Information hiding</li> </ul>	5 hours
<b>Chapter 11: Inheritance and composition</b> <ul style="list-style-type: none"> <li>- Base classes and derived classes</li> <li>- Redefining (overriding) member functions of the base class</li> <li>- Using constructors in derived classes and base classes</li> <li>- Multiple inclusions of a header file</li> <li>- Inheritance as public, protected and private</li> <li>- Composition</li> <li>- Multiple inheritance</li> </ul>	6 hours
<b>MidTerm Exam 8<sup>th</sup> week</b>	
<b>Chapter 12: Pointers, classes, virtual functions and abstract classes</b> <ul style="list-style-type: none"> <li>- Pointer data type and pointer variable</li> <li>- Address operator and dereferencing operator</li> <li>- Initializing pointer variables</li> <li>- Dynamic variables (new and delete)</li> <li>- Operations on pointer variables</li> <li>- Dynamic arrays</li> <li>- <b>sizeof function</b></li> <li>- <b>constant pointer</b></li> <li>- Classes and pointers (destructors, assignment operator, copy constructor)</li> <li>- Abstract classes and pure virtual functions</li> <li>- Polymorphism</li> <li>- <b>Function pointers</b></li> </ul>	8 hours

-Address of operator and classes	
<b>Practical Exam 12<sup>th</sup> week</b>	
<b>Chapter 13: Overloading and Templates</b> - Pointer this - Friend functions - Operator overloading (binary and unary) - Operator functions as member and nonmember functions - Function templates - Class templates	5 hours
<b>Chapter 15: Recursion</b> - Definition of recursion - Mathematical recursion	1 hour
<b>Chapter 3: File I/O</b>	1 hour
<b>Appendix F : Some Header Files</b> - ctype - Bitwise operators	2 hours

### Evaluation

- MidTerm Exam	<b>30%</b>
- Practical Exam	<b>10%</b>
- Homework & Quizzes	<b>10%</b>
- Final exam	<b>50%</b>

### Textbook

C++ Programming from problem analysis to program design, by D.S. Malik, 6<sup>th</sup> edition, Thomson.

### References

- Learning C++, by Nil Graham, latest edition, Mc. Graw Hill.
- Problem solving with C++, The object oriented programming, by Water Sevitch, latest edition, Adison Wesley.
- C++ How to program, by Deitel and Deitel, 5<sup>th</sup> edition, Prentice Hall

### Grading Scale:

<b>0 - 40</b>	<b>F</b>
<b>41-49</b>	<b>D-</b>
<b>50-53</b>	<b>D</b>
<b>54-57</b>	<b>D+</b>
<b>58-61</b>	<b>C-</b>
<b>62-66</b>	<b>C</b>
<b>67-70</b>	<b>C+</b>
<b>71-75</b>	<b>B-</b>
<b>76-79</b>	<b>B</b>
<b>80-84</b>	<b>B+</b>
<b>85-89</b>	<b>A-</b>
<b>90-100</b>	<b>A</b>

**ملاحظة 1:** في حالة التغيب عن امتحان الـ **Mid Term** لن يكون هناك امتحان تعويضي إلا في حالة وجود عذر وحالة طارئة من المستشفى. على الطالب إبراز العذر لمدرس المادة في فتره لا تتجاوز الثلاثة أيام من تاريخ الامتحان, وللمدرس الحق في قبول أو رفض العذر , وحسب التعليمات.

**ملاحظة 2:** لتفادي المشاكل والأخطاء التي تنتج, لا يجوز إجراء النقل الداخلي بأي حال من الأحوال.