## ATTACHMENT 2 (e)

## Course Specifications

## Kingdom of Saudi Arabia

The National Commission for Academic Accreditation \& Assessment

## Course Specifications

(CS)

المملكــة العربيــة السعوديـة


## Course Specifications

| Institution | Date of Report |
| :--- | :---: |
| Najran University | $17 / 2 / 2015$ |
| College/Department : |  |
| College of Science and Arts Sharourah/ Department of Computer Science |  |

## A. Course Identification and General Information

1. Course title and code:

2. Credit hours: 4
3. Program(s) in which the course is offered.
(If general elective available in many programs indicate this rather than list programs)
Computer Science Program
4. Name of faculty member responsible for the course

Dr. Makarem Mohammed Bamatraf
5. Level/year at which this course is offered:

Level 2 /First Year
6. Pre-requisites for this course (if any)

101CS-4 (Introduction to Computers and IT)
7. Co-requisites for this course (if any)

None
8. Location if not on main campus

Male and Female Branches
9. Mode of Instruction (mark all that apply)

| a. Traditional classroom | What percentage? | 100\% |
| :---: | :---: | :---: |
| b. Blended (traditional and online) | What percentage? |  |
| c. e-learning | What percentage? |  |
| d. Correspondence | What percentage? |  |
| f. Other | What percentage? |  |

Comments:

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## B Objectives

1. What is the main purpose for this course?

The main purposes of this course are to make student able to:

1) Memories general principles of programming languages.
2) Apply general principles of programming languages using $\mathrm{C}++$.
3) Design suitable solutions for problems using programming principles.
2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field)

## C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

This course covers introduces students to the fundamentals of structured programming using C++ language. The following topics: Basic components of C++ language such as Symbols, Keywords, variables, constants, expressions, assignment statement, increment and decrement operations. Input/output functions. Conditional statements, repetition statements, arrays and strings, functions, pointers and structures. Using pointers for call by value and call by reference.

| 1. Topics to be Covered |  |  |
| :--- | :---: | :---: |
| List of Topics | No. of <br> Weeks | Contact Hours |
| Introduction: <br> 1) | What is the meaning of program and Structured programming. <br> 2) | Specifications of C++ as a programming language. <br> 3) <br> Transforming a high level program into low level program <br> (Editing - Compiling - executing) |
| 4) | Concept of problem solving using flow charts. |  |
| 5) | General form of C++ program. |  |
| 6) | Input and output statements (cin , cout ) and using endl. |  |
| Basic components of C++ language |  |  |
| 1) | Symbols |  |
| 2) | Keywords |  |
| 3) | Variables: Naming rules and Data Types | 2 |
| 4) | Constants |  |
| 5) | Expressions: mathematical and logical expression: Operations and |  |
| priority rules. |  |  |
| 6) | Assignment statement |  |
| 7) | Increment and decrement operations |  |
| C++ I/O more details |  |  |
| 1) | Input/output more special characters. |  |
| 2) | Output manipulation library iomanip.h (serw(), setprecision()) | 1 |

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| Conditional Statements <br> 1) "if" statement <br> 2) "if" statement with "else" <br> 3) Nested "if" and "else" statements <br> 4) "switch" statement | 2 | 6 |
| :---: | :---: | :---: |
| Repetition Statements: <br> 1) "for" statement <br> 2) "while" statement <br> 3) "do while" statement <br> 4) "continue" and "break" commands <br> 5) Conversion from "for" to "while" and vice versa. | 2 | 6 |
| Arrays and Strings <br> 1) String data type <br> 2) One dimensional array <br> 3) Two dimensional array | 2 | 6 |
| Functions in C++ <br> 1) The Concept of function <br> 2) Library functions, for example mathematical functions. <br> 3) User defined functions <br> a. Definition of function name, type of arguments and return values. <br> b. Global and local variables in side functions or immediately declared after include statement. <br> c. Function prototype | 3 | 6 |
| Pointers and Structures <br> 1) Pointer type <br> a. Meaning of pointers <br> b. Declation of pointers <br> c. Using mathematical operations (++, -- , + , -) with pointers <br> d. Using pointers for call by reference in functions (call by value vs. call by reference) <br> 2) Struct type <br> a. Meaning of struct <br> b. Definition of struct <br> c. Using struct as an argument to functions | 2 | 6 |

## 1. Topics to be Covered in Lab

| List of Topics | No. of <br> Weeks | Contact Hours |
| :--- | :---: | :---: |
| Introduction: <br> 1)Structure of a C++ program (iostream library for supporting <br> input/output) with main() function. <br> 2)Editing, compiling and running hello program using cin and cout <br> statements with endl emphasis for cout. | 1 | 2 |

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| Basic components of $\mathrm{C}++$ language <br> 1) Variables: <br> a. Declaring data types (int, long int, short int, float, char, bool, singed, unsigned) <br> b. Example of errors arises when violating naming rules. <br> 2) Declaring constants (using const and define) <br> 3) Expressions: mathematical and logical expression: <br> a. Operations $(+,-, *, /, \%, \& \&, \\|,!,==\rangle,,\langle \rangle=,\langle=$, != <br> b. Practice priority rules of operations. <br> 4) Assignment statement (=) <br> a. The form $\mathrm{x}=5$ (single assignment) <br> b. The form $\mathrm{x}=\mathrm{y}=\mathrm{z}=5$ (compound assignment) <br> 5) Increment and decrement operations (++, --) | 2 | 4 |
| :---: | :---: | :---: |
| C++ I/O more details <br> 1) Input/output special characters ( $\left.\backslash \mathrm{n}, \backslash \mathrm{t}, \backslash \backslash, \^{\prime \prime}\right)$ to be used in examples for managing output consul screen. <br> 2) Output manipulation library iomanip.h (serw(), setprecision()) | 1 | 2 |
| Conditional statements <br> 1) "if" statement <br> 2) "if" statement with "else" <br> 3) Nested "if" and "else" statements <br> 4) "switch" statement | 2 | 4 |
| Repetition Statements <br> 1) "for" statement <br> 2) "while" statement <br> 3) "do while" statement <br> 4) "continue" and "break" commands <br> 5) Conversion from "for" to "while" and vice versa. | 2 | 4 |
| Arrays and Strings <br> 1) String data type <br> 2) One dimensional array <br> 3) Two dimensional array <br> 4) Examples on manipulating string and arrays | 2 | 4 |
| Functions in C++ <br> 1) The Concept of function <br> 2) Library functions (for example mathematical functions) such as: $(\cos (), \sin ()$, floor(), pow(), fmod(), sqrt(), $\operatorname{ceil())}$ <br> 3) User defined functions <br> a. Definition of function name, type of arguments and return value (void or typed). <br> b. Global and local variables in side functions or immediately declared after include statement. <br> c. Example Function prototype | 2 | 4 |

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| Pointers and Structures |  |  |  |
| ---: | :---: | :---: | :---: |
| 1)Pointer type  <br> a. Meaning of pointers <br> b. Definition of pointers <br> c. Using mathematical operations (++,,,--+-$)$ with pointers <br> d. Using pointers for call by reference in functions (call by <br> value vs. call by reference) 2 | 4 |  |  |
| 2) | Struct type |  |  |
| a. | Meaning of struct |  |  |
| b. | Definition of struct |  |  |
| c. | Using struct with as an argument to functions |  |  |

2. Course components (total contact hours and credits per semester):

|  | Lecture | Tutorial | Laboratory | Practical | Other: | Total |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Contact <br> Hours | 45 |  | 30 |  |  | 75 |
| Credit | 45 |  | 15 |  |  | 60 |

3. Additional private study/learning hours expected for students per week.
4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

Course Learning Outcomes, Assessment Methods, and Teaching Strategy work together and are aligned. They are joined together as one, coherent, unity that collectively articulate a consistent agreement between student learning, assessment, and teaching.

The National Qualification Framework provides five learning domains. Course learning outcomes are required. Normally a course has should not exceed eight learning outcomes which align with one or more of the five learning domains. Some courses have one or more program learning outcomes integrated into the course learning outcomes to demonstrate program learning outcome alignment. The program learning outcome matrix map identifies which program learning outcomes are incorporated into specific courses.

On the table below are the five NQF Learning Domains, numbered in the left column.
First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). Second, insert supporting teaching strategies that fit and align with the assessment methods and intended learning outcomes. Third, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy ought to reasonably fit and flow together as an integrated
learning and teaching process. Fourth, if any program learning outcomes are included in the course learning outcomes, place the @ symbol next to it.

Every course is not required to include learning outcomes from each domain.

|  | NQF Learning Domains <br> And Course Learning Outcomes | Course Teaching Strategies | Course Assessment Methods |
| :---: | :---: | :---: | :---: |
| 1.0 | Knowledge |  |  |
| 1.1 | Memorize the principles and fundamentals of programming languages (C language) | Lecture | Written Exam |
| 1.2 | Recall the theoretical and practical background when they need to use. | Lecture, Practical | Written Exam |
| 2.0 | Cognitive Skills |  |  |
| 2.1 | Uses logical thinking to develop solutions to the real life problems using programming languages (C language). | Laboratory | Lab assignments, Written Exam |
| 2.2 | Apply experiences and places the appropriate solutions in the field of computer programs. | Laboratory | Lab assignments, Written Exam |
| 3.0 | Interpersonal Skills \& Responsibility |  |  |
| 3.1 |  |  |  |
| 3.2 |  |  |  |
| 4.0 | Communication, Information Technology, Numerical |  |  |
| 4.1 | Uses statistical techniques and the basics of mathematics in programming language. | Lecture, Laboratory | Lab assignments, Written Exam |
| 4.2 |  |  |  |
| 5.0 | Psychomotor |  |  |
| 5.1 |  |  |  |
| 5.2 |  |  |  |

## Suggested Guidelines for Learning Outcome Verb, Assessment, and Teaching

| NQF Learning Domains | Suggested Verbs |
| :--- | :--- |
| Knowledge | list, name, record, define, label, outline, state, describe, recall, memorize, <br> reproduce, recognize, record, tell, write |
| Cognitive Skills | estimate, explain, summarize, write, compare, contrast, diagram, <br> subdivide, differentiate, criticize, calculate, analyze, compose, develop, <br> create, prepare, reconstruct, reorganize, summarize, explain, predict, <br> justify, rate, evaluate, plan, design, measure, judge, justify, interpret, <br> appraise |
| Interpersonal Skills \& Responsibility | demonstrate, judge, choose, illustrate, modify, show, use, appraise, <br> evaluate, justify, analyze, question, and write |


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| :---: | :---: |
| Communication, Information Technology, Numerical | demonstrate, calculate, illustrate, interpret, research, question, operate, appraise, evaluate, assess, and criticize |
| Psychomotor | demonstrate, show, illustrate, perform, dramatize, employ, manipulate, operate, prepare, produce, draw, diagram, examine, construct, assemble, experiment, and reconstruct |

Suggested verbs not to use when writing measurable and assessable learning outcomes are as follows:

| Consider | Maximize | Continue | Review | Ensure | Enlarge | Understand |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: |
| Maintain | Reflect | Examine | Strengthen | Explore | Encourage | Deepen |

Some of these verbs can be used if tied to specific actions or quantification. Suggested assessment methods and teaching strategies are:

According to research and best practices, multiple and continuous assessment methods are required to verify student learning. Current trends incorporate a wide range of rubric assessment tools; including web-based student performance systems that apply rubrics, benchmarks, KPIs, and analysis. Rubrics are especially helpful for qualitative evaluation. Differentiated assessment strategies include: exams, portfolios, long and short essays, log books, analytical reports, individual and group presentations, posters, journals, case studies, lab manuals, video analysis, group reports, lab reports, debates, speeches, learning logs, peer evaluations, self-evaluations, videos, graphs, dramatic performances, tables, demonstrations, graphic organizers, discussion forums, interviews, learning contracts, antidotal notes, artwork, KWL charts, and concept mapping.

Differentiated teaching strategies should be selected to align with the curriculum taught, the needs of students, and the intended learning outcomes. Teaching methods include: lecture, debate, small group work, whole group and small group discussion, research activities, lab demonstrations, projects, debates, role playing, case studies, guest speakers, memorization, humor, individual presentation, brainstorming, and a wide variety of hands-on student learning activities.
5. Schedule of Assessment Tasks for Students During the Semester

|  | Assessment task (e.g. essay, test, group project, examination, speech, <br> oral presentation, etc.) | Week Due | Proportion of Total <br> Assessment |
| :---: | :--- | :--- | :---: |
| 1 | Mid-term exam | 8 | 20 |
| 2 | Quizzes and Assignments | During the <br> semester | 10 |
| 3 | Mid-Tem Lab Exam | 10 | 10 |
| 4 | Final Lab Exam | 15 | 10 |
| 5 | Final Exam | At the end <br> of semester | 40 |
| 6 | Attendance | During the <br> semester | 10 |

## D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

For one credit hours there are three office hours per week for this course.

## E. Learning Resources

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1. List Required Textbooks
Programming in C++ (Arabic Edition), Dr. Yaser M. et al, 2006. (for syllabus details)
The Complete guide to C++ Programming, (for more details and deffintions)
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2. List Essential References Materials (Journals, Reports, etc.)
3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)
4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.)
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

Lab computer or personal computer with $\mathrm{C}++$ compiler (Div $\mathrm{C}++$ or visual Turbo C).

## F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)

1-Class room with 30seats
2-Computer lab. With 30seats

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2. Computing resources (AV, data show, Smart Board, software, etc.)

1- Data show with screen.
2- Lab computer or personal computer with $\mathrm{C}++$ compiler ( $\mathrm{Dev} \mathrm{C}++$ or Trubo C visual).
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

## G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching:
$\checkmark$ Distribution of a questionnaire for students to know how to achieve the goals in the theoretical and practical side.

2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor:
$\checkmark$ Discussions with colleagues who specialize in teaching methods and means of learning.
$\checkmark$ Self-evaluation of the performance of the teacher.
$\checkmark$ Discussions with other colleagues who taught this course.
3 Processes for Improvement of Teaching
$\checkmark$ Diagnose weaknesses and turn them into strengths.
$\checkmark$ Discussions about the decision and methods of teaching
$\checkmark$ Study the needs of the labor market of college graduates
4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution)

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

Faculty or Teaching Staff: Dr. Makarem Mohammed Bamatraf $\qquad$
Signature: $\qquad$
Received by: $\qquad$ Dean/Department Head

Signature: $\qquad$ Date: $\qquad$

Form 5a_Course Specifications _SSRP_1 JULY 2013

