ATTACHMENT 2 (e)

Course Specifications

Kingdom of Saudi Arabia

The National Commission for Academic Accreditation & Assessment

Course Specifications
(CS)

Course Specifications

Institution	Najran University	Date of Report
College/Department : Faculty of Art and Science /Computer Science Department		

A. Course Identification and General Information

1. Course title and code:
   Title: Discrete Math   Code: 303MATH-3 (٣٠٣ريض-٣)

2. Credit hours : 3

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. Ehab Tawfeek Alnfrawy

5. Level/year at which this course is offered:
   Level 3 / Second Year

6. Pre-requisites for this course (if any)
   202MATH-3 Calculus

7. Co-requisites for this course (if any)
n/a

8. Location if not on main campus
   Male and Female Branch

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:

We still teach this course using traditional methods but we submit most materials by using eLearning system of the university at (lms.nu,edu.sa)

B Objectives

1. What is the main purpose for this course? 1) To make the student familiar with the theoretical laws and formulas of series, mathematical induction, and mathematical logic 2) To make the student has knowledge about graphs and their representations 3) To make the student has knowledge about counting theory and their using in different fields
2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g.,)

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

This course cover the mathematical topics most directly related to computer science. Topics include: Foundations of Logic, Foundations proof techniques, Counting, Induction Sequences, Sums and Recursion, Induction of number system and number theory, graph and tree theory.

1. Topics to be Covered		
List of Topics	No. of Weeks	Contact Hours
The Foundations of Logic Propositional statements Basic logical operations, truth table, tautology and contractions, logical equivalence, algebra of Propositional, Boolean algebra.	2 1/3	7
The Foundations Proofs Direct proof , contraction proof, math deduction proof	2	6
Induction Sequences, Sums and Recursion Recruit relations, linear Recruit relations, second Recruit relations	2	6
Counting Basic counting principle, permeation, computation, and some properties of counting.	2	6
Induction of number system and number theory Number system, operation of number, foundation of number theory, GCD, LCM, prime number and its property	2	6
Graphs Basic defection of graph , travers, path, graph algorithm, direct graph, short path	2 1/3	7
Trees Basic definition of tree, binary tree, represent binary tree, binary tree search.	2 1/3	7

2. Course components (total contact hours and credits per semester):						
	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	45					45
Credit	45					45

3. Additional private study/learning hours expected for students per week.	3 hours

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 And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	Memorize the laws of mathematical logic	Lecture	Achievement Test
1.2	Determine the appropriate method of proof (direct proof - Reverse Proof – Mathematical Induction Proof) to resolve certain properties	Lecture	Achievement Test
1.3	Determine the different types of Graphs and how to represent it.	Lecture	Achievement Test
2.0	**Cognitive Skills**		
2.1	Apply mathematical logic laws on different logical expressions	Lecture , Discussion	Achievement Test, Home Duties
2.2	Prove the mathematical equations and inequalities using different methods of proof (direct proof - Reverse Proof – Mathematical Induction Proof).	Lecture , Discussion	Achievement Test, Home Duties
2.3	Compare the different counting methods their and applications	Lecture , Discussion	Achievement Test, Home Duties
2.4	Solve the exercises using the Graph theory	Lecture , Discussion	Achievement Test, Home Duties
3.0	**Interpersonal Skills & Responsibility** n/a		
3.1			
3.2			
4.0	**Communication, Information Technology, Numerical** n/a		
4.1			
5.0	**Psychomotor** n/a		
5.1			

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, reproduce, recognize, record, tell, write
Cognitive Skills	estimate, explain, summarize, write, compare, contrast, diagram, subdivide, differentiate, criticize, calculate, analyze, compose, develop, create, prepare, reconstruct, reorganize, summarize, explain, predict, justify, rate, evaluate, plan, design, measure, judge, justify, interpret, appraise

Interpersonal Skills & Responsibility	demonstrate, judge, choose, illustrate, modify, show, use, appraise, evaluate, justify, analyze, question, and write
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, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	examination (mid-term)	8th -9th	20%
2	Quizzes ,and in-class or out-class activities and duties	Through the semester	20%
4	Attendees and Actives	Through the semester	10%
5	examination (final term)	Depending on the Examination Schedule	50%

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) 10 Offices Hours support (according office door schedules) and Emails support (7am - 4pm during Sun-Thu) and eLearning system (Black Board) support (7am - 4pm during Sun- Thu)

E. Learning Resources

1. List Required Textbooks • Kenneth Rosen, " Discrete Mathematics and its Applications", 7th Edition, McGraw-Hill, 2012. Alternatively, 6th Edition, 2007.
2. List Essential References Materials (Journals, Reports, etc.)
3. List Recommended Textbooks and Reference Material (Journals, Reports, etc) • MIT Mathematics for Computer Science Lecture notes – online notes - (http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-042j-mathematics-for-computer-science-fall-2010/readings/MIT6_042JF10_notes.pdf) • Rafael Pass, Cornell.EDU "A Course in Discrete Structures" (http://www.cs.cornell.edu/~rafael/discmath.pdf) • SUSANNA S. EPP, DISCRETE MATHEMATICS WITH APPLICATIONS, 4th ed, Brooks/Cole Cengage Learning, 2011
4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.) • Discrete Mathematics and Its Applications Kenneth H. Rosen, AT&T Laboratories Self Assessments (http://www.mhhe.com/math/advmath/rosen/r5/instructor/assess/index.html)
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

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.) • Classrooms for 20-30 students with data show • Option not mandatory Laboratories 20-30 students with Mathematica or Maple

2. Computing resources (AV, data show, Smart Board, software, etc.) • Classrooms Should include data show and also laboratories
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) • More English References in the Library

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching: ✓ 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: ✓ Discussions with colleagues who specialize in teaching methods and means of learning. ✓ Self-evaluation of the performance of the teacher. ✓ Discussions with other colleagues who taught this course.
3 Processes for Improvement of Teaching ✓ Diagnose weaknesses and turn them into strengths. ✓ Discussions about the decision and methods of teaching ✓ 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. Ehab Tawfeek Alnfrawy

Signature: ________________________________ **Date Report Completed: ____________________**

Received by: ______________________________ **Dean/Department Head**

Signature: ________________________________ **Date: _______________**