



## Course Specification

**Course Name:** [Computer Simulation Languages ]

**Course Code:** [DS443]

### I. Basic Course Information

Major or minor element of program: Major

Department offering the course: Operations Research and Decision Support Department

Academic level: [400 Level]

Semester in which course is offered: [First (fall) Semester]

Course pre-requisite(s): DS241 [Computer Modeling & Simulation]

Credit Hours: 3

Contact Hours Through:

Lecture	Tutorial *	Practical *	Total
2.5	[0.0]	[1.5]	4.0

\* 1.5 hours for **either** Tutorial or Practical

Authorization date of course specification: September 2014

### II. Overall Aims of Course

[A Decision Support and Computer Science Student Equipped with Methodology, Basic Competences and Practical Experience in implementing Simulation Models using alternative special purpose Computer simulation Languages. ]

### III. Program ILOs covered by course

Program Intended Learning Outcomes (By Code)			
Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
[K3,K16,K19,K22 ]	[I4,I6,I11,I13 ]	[P13,P14,P15 ]	[G7,G9 ]



## Course Specification

### IV. Intended Learning Outcomes of Course (ILOs)

#### a. Knowledge and Understanding

On completing the course, students should be able to:

- K.1 Recognize the role of Computer Model Building Languages in Problem Solving, Planning and Decision Making.
- K.2 Describe the advantages and limitation of Applying Computer Modeling versus procedural Languages to construct simulation models.
- K.3 Recognize and understand Modeling Support, Statistical capabilities and other computer facilities of alternative Computer Simulation Languages.
- K.4 Apply computer languages to implement both fixed and variable time advance simulation models.

#### b. Intellectual/Cognitive Skills

On completing the course, students should be able to:

- I.1 Compare and evaluate simulation modeling languages to solve alternative systems and problems.
- I.2 Test and analyze the efficiency and effectiveness of Computer simulation modeling languages.
- I.3 Plan for and design a simulation experiment based on simulation language.
- I.4 Analyse systems with the objectives of applying alternative computer modeling languages.
- I.5 Compare simulation languages to other computer programming languages.

#### c. Practical/Professional Skills

On completing the course, students should be able to:

- P.1 Plan and apply variable time advance discrete event simulation languages (such as Arena) to real world problems.
- P.2 Plan and apply fixed time advance discrete event simulation languages (such as VDSS) to real world problems.
- P.3 Learn about the utilization of simulation languages to solve systems of linear and non linear equations.

#### d. General and Transferable Skills

On completing the course, students should be able to:

- G.1 Plan for System design and analysis based on computer languages.
- G.2 Acquire Computer programming skills.
- G.3 Apply programming languages to real world situation.

### V. Course Matrix Contents

	Main Topics / Chapters	Duration (Weeks)	Course ILOs Covered by Topic (By ILO Code)			
			K & U	I.S.	P.S.	G.S.
1-	[Historical Developments, features and capabilities of computer modeling languages.]	[1 ]	[K1,K2 ]	[ ]	[ ]	[G3 ]
2-	[Fixed Time Advance computer simulation using VDSS language ( main features and capabilities). ]	[2 ]	[K2,K3 ]	[I1,I2 ]	[P2,P3 ]	[G2 ]



Course Specification

3-	Applications of VDSS language to modeling and problem solving.	[3	[K4	[I3,I4	[P2,P3	[G1,G3
4-	Event and process -based discrete event computer simulation languages.- an Introduction to Arena. ]	[2 ]	[K2,K3 ]	[I1,I2 ]	[P1 ]	[G2 ]
5-	Graphical Modeling, data management and statistical capabilities of Arena. ]	[2 ]	[K4 ]	[I3,I4 ]	[P1,P3 ]	[G1,G3 ]
6-	An illustrative real world example of computer simulation using Arena language. ]	[3 ]	[K4 ]	[I3,I4,I5 ]	[P1,P3 ]	[G1,G3 ]

VI. Course Weekly Detailed Topics / hours / ILOs

Week No.	Sub-Topics	Total Hours	Contact Hours	
			Theoretical Hours	Practical Hours *
1	An Overview of Computer modeling Languages ]	[2.5 ]	[2.5 ]	
2	Main features of Visual Decision Support Systems (VDSS) ]	[4 ]	[2.5 ]	[1.5 ]
3	Simulation using VDSS ]	[4 ]	[2.5 ]	[1.5 ]
4	Corporate Financial Planning Models in VDSS ]	[4 ]	[2.5 ]	[1.5 ]
5	Production and Inventory Systems in VDSS ]	[4 ]	[2.5 ]	[1.5 ]
6	Simple Economic Simulation Models in VDSS ]	[4 ]	[2.5 ]	[1.5 ]
7	<b>Midterm Exam</b>			
8	Discrete Event Simulation using Arena Computer Language ]	[4 ]	[2.5 ]	[1.5 ]
9	Single Server Queuing Model using Arena ]	[4 ]	[2.5 ]	[1.5 ]
10	Graphical Model Building in Arena ]	[4 ]	[2.5 ]	[1.5 ]
11	Data Management and Statistics in Arena ]	[4 ]	[2.5 ]	[1.5 ]
12	Controlling and Running Simulation using Arena ]	[4 ]	[2.5 ]	[1.5 ]
13	Real world Simulation Models using Arena (1) ]	[4 ]	[2.5 ]	[1.5 ]
14	Real world Simulation Models using Arena (2) ]	[4 ]	[2.5 ]	[1.5 ]
15	<b>Final Exam</b>			
<b>Total Teaching Hours</b>		<b>51</b>	<b>33</b>	<b>18</b>

\* No Practical/Tutorial during the first week of the semester



Course Specification

VII. Teaching and Learning Methods

Teaching/Learning Method	Selected Method	Course ILOs Covered by Method (By ILO Code)			
		K & U	Intellectual Skills	Professional Skills	General Skills
Lectures & Seminars	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tutorials	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Computer lab Sessions	<input checked="" type="checkbox"/>	[All]	[All]	[All]	[All]
Practical lab Work	<input checked="" type="checkbox"/>	[All]	[All]	[All]	[All]
Reading Materials	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Web-site Searches	<input checked="" type="checkbox"/>	<input type="checkbox"/>	[I3-I5]	<input type="checkbox"/>	<input type="checkbox"/>
Research & Reporting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Problem Solving / Problem-based Learning	<input checked="" type="checkbox"/>	[K3,K4]	[All]	[All]	[All]
Projects	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Independent Work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Group Work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Case Studies	<input checked="" type="checkbox"/>	[K3,K4]	[All]	[All]	[All]
Presentations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Simulation Analysis	<input checked="" type="checkbox"/>	[K3,K4]	[All]	[All]	[All]
Others (Specify):	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

VIII. Assessment Methods, Schedule and Grade Distribution

Assessment Method	Selected Method	Course ILOs Covered by Method (By ILO Code)				Assessment Weight / Percentage	Week No.
		K & U	I.S.	P.S.	G.S.		
Midterm Exam	<input checked="" type="checkbox"/>	[K1,K2I]	[All]	<input type="checkbox"/>	<input type="checkbox"/>	[10%]	7
Final Exam	<input checked="" type="checkbox"/>	[K1,K2I]	[All]	<input type="checkbox"/>	<input type="checkbox"/>	60%	15
Quizzes	<input checked="" type="checkbox"/>	[K1,K2I]	[All]	<input type="checkbox"/>	<input type="checkbox"/>	[10%]	[5, 9]
Course Work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Report Writing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Case Study Analysis	<input checked="" type="checkbox"/>	[K3,K4]	[All]	[All]	[All]	[10%]	<input type="checkbox"/>
Oral Presentations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Practical	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Group Project	<input checked="" type="checkbox"/>	[K3,K4]	[All]	[All]	[All]	[10%]	[12]
Individual Project	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Others (Specify):	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



## Course Specification

### IX. List of References

<b>Essential Text Books</b>	<ul style="list-style-type: none"><li>• Trueblue Systems (2006) "Visual DSS" Reference Manual, Australia, September.</li><li>• Kelton, Sadowski and Sturrock (2007) "Simulation with arena", Fourth Edition, McGraw-Hill International Edition, New York.</li><li>• Rockwell Automation (2007) "Arena- User's Guide", Alen Bradely,</li><li>• Rockwell software.</li><li>• Rockwell Automation (2007) "Arena- Templates Developer's Guide"</li><li>• Alen Bradely, Rockwell software.</li><li>• Trueblue Systems (2007) "Visual DSS- User's Guide", Australia, September.</li></ul>
<b>Course notes</b>	<ul style="list-style-type: none"><li>• Hand outs to the students (Hard Copy and Electronic on Web)</li></ul>
<b>Recommended books</b>	<ul style="list-style-type: none"><li>• None</li></ul>
<b>Periodicals, Web sites, etc ...</b>	<ul style="list-style-type: none"><li>• <a href="http://trueblue.com.au/">http://trueblue.com.au/</a></li><li>• <a href="http://www.rockwellautomation.com">www.rockwellautomation.com</a></li></ul>

### X. Facilities required for teaching and learning

List the facilities required

- Teaching Accommodation
- Data Show Facility
- Computers
- Computer Labs

**Course coordinator:** Prof. Motaz Khorshid

**Head of Department:** Prof. Mohamed Mostafa Saleh

**Date:** September 2014