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**Project Title:** Modernization of Teaching Methodologies in Higher Education: Eu Experience For Jordan And Palestinian Territory

**Project acronym:** METHODS

**Project Number:** 561940-EPP-1-2015-1-JO-EPPKA2-CBHE-JP

**Funding scheme:** Erasmus+ Programme (Capacity-Building projects in the field of Higher Education (E+CBHE))

**Start date of the project:** 15/10/2015                      **Duration:** 36 months

<b>Deliverable title</b>	<b>Course Outline</b>
<b>Author(s)</b>	<b>Saleh Al-Jazar Eman Abdelhafez Esraa Bashayreh</b>
<b>Organisation name(s)</b>	<b>Al-Zaytoonh University of Jordan</b>
<b>WP Number</b>	<b>5</b>
<b>WP Leader</b>	<b>Birzeit University</b>

**Project co-ordinator name, title and organisation:**

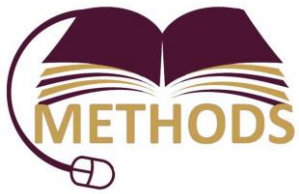
Prof. Ahmed Al-Salaymeh, The University of Jordan (UJ)

**Address:** Queen Rania Street, Amman 11942, Jordan

**Tel:** +962-6-53 55 000 Ext. 22816 **Mob:** +962-777-64 4364 **Fax:** +962-6-53 00 237

**Email:** [methods@ju.edu.jo](mailto:methods@ju.edu.jo)

**Project website:** <http://methods.ju.edu.jo>



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## Al-Zaytoonh University of Jordan (ZUJ)

### Faculty of Engineering and Technology

<b>Course title/code</b>	Engineering Numerical Methods	0911361
<b>Instructor /office</b>	Saleh Al-Jazar Eman Abdelhafez Esraa Bashayreh	
<b>Semester- Year</b>	Fall- 2017/2018	
<b>Compulsory/Elective</b>	Compulsory	
<b>Prerequisites</b>	Calculus II for Engineering Students	

<b>Course Description</b>	This course covers the following topics: Introduction to Numerical Methods: significance and applications. Algorithm Design. Computer representation of numbers and their arithmetic manipulations, error propagation, condition, stability and convergence. Solution of Non-linear Algebraic equations in single and multi-variables. Solution of systems of linear algebraic equations. Numerical Approximations and Curve-fitting. Numerical differentiation: first and higher order derivatives. Numerical integration. Solution of Ordinary differential equations using numerical methods
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<b>Generic Competences*</b>	<ul style="list-style-type: none"> <li>An ability to apply knowledge of mathematics, science, and engineering</li> <li>An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.</li> </ul>
<b>Specific Competences (SCs)</b>	<ol style="list-style-type: none"> <li>Finding the roots</li> <li>Solve set of linear equations.</li> <li>Solve numerical integration</li> <li>Analyze differential equations</li> </ol>

- These competences related also to the project Methods

	<b>Course Contents</b>	<b>SC1</b>	<b>SC2</b>	<b>SC3</b>	<b>SC4</b>
<b>1</b>	Finding the roots	x			
<b>2</b>	Solve set of linear equations.	x			
<b>3</b>	Solve numerical integration			x	
<b>4</b>	Analyze differential equations		x		

Schedule				
Week	Subject	Activity Description *	Evaluation Criterion	
			Description	%
1	Introduction to Numerical Methods: significance and applications.	Online videos will be assigned for viewing	Homework Assignments	5%
2,3	Solution of Non-linear Algebraic equations in single and multi-variables	Online videos will be assigned for viewing	Homework Assignments	5%
4,5,6	Solution of systems of linear algebraic equations	Online videos will be assigned for viewing	Homework Assignments	5%
7,8	Numerical Approximations and Curve-fitting	Online videos will be assigned for viewing		
9	Numerical differentiation	Online videos will be assigned for viewing		
10,11	Numerical integration	Online videos will be assigned for viewing		
12-16	Solution of Ordinary differential equations using numerical methods	Online videos will be assigned for viewing	Homework Assignments	5%

\* PBL, MOOC, Inverted Classroom should be introduced within activity description

<b>Textbook and References</b>	Numerical Methods for Engineers, by Steven Chapra and Raymond P. Canale, McGraw Hill, 2009 , 6th edition	
<b>Overall Assessment Criteria</b>	<b>Method</b>	<b>Weight [%]</b>
	Quizzes	20
	First Exam	15
	Second Exam	15
	Final Exam	50