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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

Deliverable title	Course Outline
Author(s)	Dr Nabil Al-Joulani
Organisation name(s)	Palestine Polytechnic University
WP Number	5
WP Leader	Birzeit University

Project co-ordinator name, title and organisation:

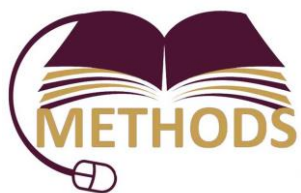
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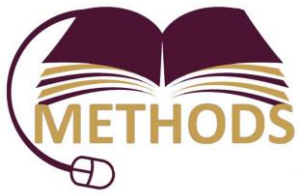
Palestine Polytechnic

College of Engineering and Technology

Course title/code	Methods of Scientific Researches	
Instructor /office	Dr Nabil Al-Joulani / B+001	
Semester- Year	Fall – 2017	
Compulsory/Elective	Compulsory	
Prerequisites	English 2 + Passes 65 credits (Semester level 5)	

Course Description & Objectives	<p>This course will help the undergraduate students pay attention to the most important dimensions and components of research methodology and tools. It will enable them 'as beginners' to impart research skills and help improve the quality of senior students or young researches. The students will utilize the best practice of information communication technology (ICT) available.</p> <p>The course is designed in a way to develop active learners, it will move from teaching to learning, from teacher centred to students centred, from competitive learning to collaborative and group learning.</p> <p>The course will employ different teaching and learning methodologies. Main focus will be on</p> <p>1) Flipped Class Rooms 2) Problems Based 3) Competency Based</p> <p>The students will read the materials and prepare before the class and will utilize the classroom time for brain storming, discussion and developing solutions for the problem assigned to them at the beginning of the semester.</p>
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Generic Competences*	1- Create active learners with competencies of 21st century 2- Read and analyse scientific research papers 3- Develop a scientific research proposal and thesis
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Specific Competences (SCs)	<ol style="list-style-type: none">1- to know the principles of scientific research2- to formulate research problem, questions and variables3- to set a clear objectives of the research4- to define clear hypothesis of the research5- to define research population and samples6- to select and use appropriate tool and data collection7- to design research experiment and set research variables8- to analyse, interpret and present the research results9- to recognize citation methods and list of references10- to develop research proposal, CV with & cover letter
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- These competences related also to the project Methods

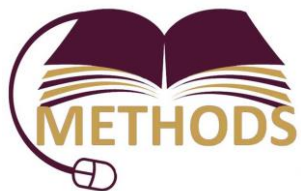
	Course contents	SC1	SC2	SC3	SC4	SC5	SC6	SC7	SC8	SC9	SC10
1	Research & Research Process	X									
2	Research Design							X			
3	Research Problem & Questions		x								
4	Research Objectives & Variables		x	x							
5	Research Hypothesis				x						
6	Research Population and Samples					x					
7	Research Tools and Data Collection						x				
8	Research Results & Analysis								X		
9	Research Types and Approaches	X	X								
10	Literature Review & Citation Methods									x	
11	Research Report and Writing										X

Schedule				
Week	Subject	Activity Description *	Evaluation Criterion	
			Description	%
1	Research & Research Process	1- Read about definition & importance of research 2- Read about the process of research & definition of the scientific research, and its main components 3- Search and print research paper (from conference or journal and analyze it to main components)	<ul style="list-style-type: none"> - The students discuss in the class different definitions of research, and scientific research - The students should submit two page summary of research article they pick from conference proceedings or journals 	Assignment #1
2	Research Design	Read the materials provided on the portal 1- Descriptive Design 2- Case study 3- Survey 4- Experimental Design <ul style="list-style-type: none"> - Pre-designs - Quasi-designs - True – designs - Standard designs 	<ul style="list-style-type: none"> - The students should form groups of 3 to 4 each. Each group will be present and discuss a flow chart of the research design in the class - Each group will be assigned research problem to work on it 	Quiz #1 in Chapter 1

3	Research Problem & Question	Students should read the materials and attend video and power points on the portal 1- Definition of research problem 2- Identification of a research problem 3- Source of research problems 4- Statement of problem	- The students should prepare different examples of research problems and discuss in the class	Quiz #2 in Chapter 2
4	Research Objectives and Variables	Students should read chapter 5 in the text book and supplementary materials from web & provided on the portal	- Each group of students should set the objectives & variables of their research point	Quiz #3 in Chapter 3
5	Research Hypothesis	Students should read chapter 6 in the text book and supplementary materials 1- Sources of Hypothesis 2- Characteristics of Hypothesis 3- Advantages of Hypothesis 4- Testing of Hypothesis	Each group of the students should form 2 to 3 hypothesis of their research problem assigned to them or they select by themselves	Quiz #4 in Chapter 4
6	Research Population & Samples	Read chapter 7 about samples and the provided materials on research population	Each group will define their population and type and number of samples	Quiz #5 in Chapter 5
7	Research Tools & Data Collection	Read chapter 8 on tools and data collection , 1- Observation 2- Interview 3- Focus Group 4- Survey (Questionnaire)	Each group will select the appropriate tool for their research and explain why they choose it. Design a questionnaire	Quiz #6 in Chapter 6
Midterm Test – End of week 7				20%
8	Research Results , Analysis & interpretation	Read chapter 9 & 10 on results analysis and interpretation, in addition to supplementary materials	Each group will present in the class how they will analyze and present their research results	Review & Discussion of chapter 8
9	Research Types & Approaches	Read chapters 11, 12 & 13 on research methods. Also, watch the video and read from power point about	Class room debate and discussion of the different types and approaches of research.	Participation & Quiz #7 in Chapter 9, 10

		1- Descriptive & Analytical Research 2- Quantitative & Qualitative Research 3- Conceptual & Empirical Research 4- Experimental research		
10	Literature Review & Citation Methods	Read the material provided on the portal. Watch videos and read power points from web on different citation methods 1- Foot Note & End Note 2- Text Note 3- Bibliography	Class room debate and discussion of the different types and approaches of research.	Participation & Quiz #8 in Chapter 11,12 and 13
11	Research Report & Writing	Read Chapter 14 & 15 of the text book.	Each group should submit their research report before presentation in week 13-15	Assignment # 3
12	Proposal, CV and Cover Letter	Read the material provided on the portal. Watch video and read about 1- CV and Cover Letter 2- Graduation Project / Thesis 3- Research Paper	Each member in the group will submit his own CV with cover letter directed to the employer	Quiz #9 in chapters 14, 15 & Assignment #4
13	Group Presentation	4 groups/ 10 minutes for each	5 to 10 Power point slides	5%
14	Group Presentation	4 groups/ 10 minutes for each	5 to 10 Power point slides	
15	Group Presentation	4 groups/ 10 minutes for each	5 to 10 Power point slides	
16	Final Examination			35%

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



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Textbook and References	<p>Research Methodology : Tools and Techniques Dr. Prabhat Pandey Dr. Meenu Mishra Pandey © Bridge Center, 2015 BRIDGE CENTER Buzau, Al. Marghiloman 245 bis, 120082 Romania, European Union ISBN 978-606-93502-7-0</p> <p>References: 1- Creswell, J. W. (2009). Research Design: Qualitative, Quantitative, and Mixed Method Approaches. 2- Kumar, R. (2005). Research methodology – A step-by-step guide for beginners. 3- Hong, L. Y. (2006). RESEARCH METHODS IN ENGINEERING AND SCIENCE. http://www.wabri.org.au/postgrads/documents/RM%20sci_eng_notes/Eng_Leung.pdf</p> <p>Web References : http://connectedresearchers.com/online-tools-for-researchers/ https://explorable.com/research-basics</p>													
Overall Assessment Criteria	<table border="1"> <thead> <tr> <th>Method</th> <th>Weight [%]</th> </tr> </thead> <tbody> <tr> <td>Attendance / participation / Flipped Class Room Activity</td> <td>15</td> </tr> <tr> <td>Project (Problem Based Learning)</td> <td>20</td> </tr> <tr> <td>Quizzes + Assignments</td> <td>10</td> </tr> <tr> <td>Midterm</td> <td>20</td> </tr> <tr> <td>Final Exam</td> <td>35</td> </tr> </tbody> </table>	Method	Weight [%]	Attendance / participation / Flipped Class Room Activity	15	Project (Problem Based Learning)	20	Quizzes + Assignments	10	Midterm	20	Final Exam	35	
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Problem Based Learning (PBL)		
	Research main items	Evaluation
Experimental Research Project Description	<p><u>Problem Statement:</u></p> <p>“ Effect of Stone Slurry Waste on Plant Growth in Clay and Sand”</p> <p><u>Objective:</u></p> <p>To investigate the effect of addition of different percentages of stone slurry waste on growth of plants in clayey and sandy soils.</p> <p><u>Research Variables :</u></p> <ul style="list-style-type: none"> - two type of soils – clay and sand - 3% of stone slurry waste by weight - 2 types of plants <p><u>Methodology :</u></p> <ul style="list-style-type: none"> - Each group consists of 3 students, will be assigned a specific % of stone slurry waste as powder. - They will mix the powder with constant weights of clay or sand as specified by instructor. - Stone slurry powder will be mixed with clay or sand and will be put in similar pots of constant volumes for all groups - Two types of plant will be planted in the pots and will be similar for all group to test the effect of % of stone powder only on growth of the plants - Each group will use similar fertilizer and irrigation amounts on similar time schedule - Each group will observe and photograph the growth of the plants and will make own observation, analysis and discussion and final presentation. <p><u>Report Writing :</u></p> <ul style="list-style-type: none"> - Each group will develop a scientific research report which include all components of the research articles as they study during the course. - Results from all groups will be gathered and compiled in one research paper and comparison of results to show effect of % of stone slurry powder on growth of plants in clay and sand soils will be presented and discussed. 	<p>Report 15%</p> <p>Presentation 5%</p>