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UNIVERSITY OF PETROLEUM & ENERGY STUDIES

Department of

School of Computer Science

Dehradun

COURSE PLAN

Programme	: B. Tech CSE DevOps
Course	: DevOps Automation
Subject Code	: CSDV 2001
No. of credits	: 1
Semester	: III
Session	: 2018-19
Batch	: 2017-21
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COURSE PLAN

A. **PREREQUISITE:**

a. DevOps Overview,
b. Source code management.

B. PROGRAM OUTCOMES(POs) for DevOps:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

B. Program Specific Outcomes (PSOs)

1. Perform system and application programming using computer system concepts, concepts of data structures, algorithm development, problem solving and optimizing techniques.
2. Apply software development and project management methodologies using concepts of front-end and back-end development and emerging technologies and platforms.
3. Apply the understanding of DevOps as cultural philosophies, practices, and tools that increase the ability to deliver applications and services at high velocity.

C. OBJECTIVES OF COURSE:-

The objectives of this course are to:

1. To enable learners to deep understanding of development automation
2. To enable learners to perform automation of code generation of delivery pipeline using RAD
3. To provide the learners a better understanding of Linux scripting environment.
4. To enable students, acquire thorough understanding of automation using scripting.

D. COURSE OUTCOMES FOR DevOps Automation: At the end of this course student should be able to:

Overall course outcome:

CO.1. Learn Linux level basics like file permissions.
CO.2. Learn user groups and working with bash to create scripts.
CO.3. Building Delivery Pipelines and automating them.
CO.4. Understand RAD, MDD/MDA and Code Generation.
CO.5. Compare advantages and disadvantages of automation.

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between COs and POs		
	Course Outcomes (COs)	**Mapped Programme Outcomes**
CO1	Learn Linux level basics like file permissions.	PO1 PO2 PO3 PO5 PO6 PO9 PO12
CO2	Learn user groups and working with bash to create scripts.	PO1 PO2 PO3 PO5 PO6 PO9 PO12
CO3	Building Delivery Pipelines and automating them.	PO1 PO2 PO3 PO5 PO6 PO9 PO12
CO4	Understand RAD, MDD/MDA and Code Generation	PO1 PO2 PO3 PO5 PO6 PO9 PO12
CO5	Compare advantages and disadvantages of automation.	PO1 PO2 PO3 PO5 PO6 PO9 PO12

Table: Correlation of POs v/s COs

PO/CO	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	2	3	2		3	2			2			2			
CO2	2	1	1		2	2			2			2			
CO3	2	2	3		2	3			2			2			
CO4	2	2	2		3	2			2			3			
CO5	2	2	2		2	2			2			3			

1. WEAK 2. MODERATE 3. STRONG

Course Code	Course Title	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO12	PSO13	PSO14	PSO15
		Engineering Knowledge	Problem analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual or team work	Communication	Project management and finance	Life-long Learning	Perform system and application programming using computer system concepts, concepts of data structures, algorithm development, problem solving and optimizing techniques.	Apply software development and project management methodologies using concepts of front-end and back-end development and emerging technologies and platforms.	Apply the understanding of DevOps as cultural philosophies, practices, and tools that increase the ability to deliver applications and services at high velocity.
CSDV 2001	DevOps Automation	2.0	2.0	2.0	0.0	2.4	2.2	0.0	0.0	2.0	0.0	0.0	2.4	0.0	0.0	0.0

E. COURSE OUTLINE

S.No	Unit	Contents
1	**Unit-1**	INTRODUCTION TO AUTOMATION
2	**Unit – 2**	ADVANTAGES OF AUTOMATION
3	**Unit – 3**	INTERACTING WITH LINUX ENVIRONMENT
4	**Unit – 4**	SCRIPTING DEVELOPMENT TASKS
5	**Unit – 5**	UNDERSTANDING MAKE AND MAKEFILES

F. PEDAGOGY

Outcome oriented pedagogy, which includes

1. Discussions, Presentations, Demos, Class Room Exercises
2. Class Test
3. Assignments
4. Concept diary (needs to be maintained by students-short and concise notes which include course concepts that he/she has understood.)

G. COURSE COMPLETION PLAN

Total Class room	24
No. of Tests (1 Test + 1 Quiz)	2 Test
No. of Assignment	2

One Session =60 minutes

EVALUATION & GRADING

Students will be evaluated based on the following 3 stages.

5.1	Internal Assessment	-	30%
5.2	Mid-term Examination	-	20%
5.2	End term Examination	-	50%

H1. INTERNAL ASSESSMENT: WEIGHTAGE – 30%

Internal Assessment shall be done based on the following:

S No.	Description	% of Weightage out of 30%
1	Class Tests	50%
2	Assignments (Problems/Presentations)	20%
3	Attendance and conduct in the class and concept diary	30%

H2. ***Internal Assessment Record Sheet:*** *will be displayed online at the end of semester i.e. last week of regular classroom teaching.*

H3. CLASS TESTS/QUIZZES: One Class Tests based on descriptive type theoretical & numerical questions and One Quiz based on objective type questions will be held; one class test at least ten days before the Mid Term Examination and quiz at least ten days before the End Term Examination. Those who do not appear in Viva-Voce and quiz examinations shall lose their marks.

The marks obtained by the students will be displayed on LMS a week before the start of Mid Term and End Term Examinations respectively.

H4. ASSIGNMENTS: After completion of second unit and 4^{th} unit, there will be home assignments based on concepts taught. Those who fail to submit the assignments by the due date shall lose their marks.

H5. GENERAL DISCIPLINE: Based on student's regularity, punctuality, sincerity and behavior in the class.

The marks obtained by the students will be displayed on LMS at the end of semester.

H6. MID TERM EXAMINATION: WEIGHTAGE – 20%

Mid Term examination shall be Two Hours duration and shall be a combination of Short and Long Theory Questions. It will be in offline manner.

Date of showing Mid Term Examination Answer Sheets: Within a week after completion of mid Sem examination.

H7. END TERM EXAMINATION: WEIGHTAGE – 50%

End Term Examination shall be Three Hours duration and shall be a combination of Short and Long theory Questions.

H8. GRADING:

The overall marks obtained at the end of the semester comprising all the above three mentioned shall be converted to a grade.

H. DETAILED SESSION PLAN

SESSIONS	TOPIC	Course Outcomes Addressed	Required Learning Resources (including media)	Assignment(s)/Quizzes/ Tests
7	**UNIT -1** INTRODUCTION TO AUTOMATION	**CO1:** Learn Linux level basics like file permissions.	DevOps Automation Material by Xebia	
$L_{1,2}$	Development Delivery Pipeline Overview			
L_3	Automating the build pipeline			
$L_{4,5}$	RAD (Rapid Application Development)			

L_6	Code generation			
L7	MDA/MDD (Model-Driven Architecture/Development)			
4	**UNIT 2:** ADVANTAGES OF AUTOMATION			
$L_{8,9}$	Scenarios where automation saves time and effort	**CO2:** Learn user groups and working with bash to create scripts. **CO1:** Learn Linux level basics like file permissions.	DevOps Automation Material by Xebia	
$L_{10,11}$	Scenarios where automation prevent errors.			Assignment-1 & **Class Test-01**
4	**UNIT-3:** INTERACTING WITH LINUX ENVIRONMENT			
L12	Understanding Linux file system	CO3: Building Delivery Pipelines and automating them. CO4: Understand RAD, MDD/MDA and Code Generation	DevOps Automation Material by Xebia	
$L_{13,14}$	User groups and permissions			**Mid Exam**
L_{15}	working with Bash			
4	**Unit-4** SCRIPTING			

	DEVELOPMENT TASKS			
$L_{16,17}$	Writing automation scripts	CO3: Building Delivery Pipelines and automating them. CO4: Understand RAD, MDD/MDA and Code Generation	DevOps Automation Material by Xebia	
$L_{18, 19}$	Best practices for scripting			
5	**UNIT-5:** UNDERSTANDING MAKE AND MAKEFILES			
$L_{20,}$ 21	UNDERSTANDING MAKE	**CO5:** Compare advantages and disadvantages of automation.	**Class Test-2/ Assignment-2** **End Exam**	
$L_{22, L23, L24}$	UNDERSTANDING MAKEFILES			

GUIDELINES

***Cell Phones and other Electronic Communication Devices*:** Cell phones and other electronic communication devices (such as Blackberries/Laptops) are not permitted in classes during Tests or the Mid/Final Examination. Such devices MUST be turned off in the class room.

E-Mail and online learning tool: Each student in the class should have an e-mail id and a pass word to access the LMS system regularly. Regularly, important information – Date of conducting class tests, guest lectures, via online learning tool. The best way to arrange meetings with us or ask specific questions is by email and prior appointment. All the assignments preferably should be uploaded on online learning tool. Various research papers/reference material will be mailed/uploaded on online learning platform time to time.

Attendance: Students are required to have **minimum attendance of 75%** in each subject. Students with less than said percentage shall **NOT** be allowed to appear in the end semester examination.

Course outcome assessment: To assess the fulfilment of course outcomes two different approaches have been decided. Degree of fulfillment of course outcomes will be assessed in different ways through direct assessment and indirect assessment. In Direct Assessment, it is measured through quizzes, tests, assignment, Mid-term and/or End-term examinations. It is suggested that each examination is designed in such a way that it can address one or two outcomes (depending upon the course completion). Indirect assessment is done through the student survey which needs to be designed by the faculty (sample format is given below) and it shall be conducted towards the end of course completion. The evaluation of the achievement of the Course Outcomes shall be done by analyzing the inputs received through Direct and Indirect Assessments and then corrective actions suggested for further improvement.

Passing criterion: Student has to secure minimum 40% marks of the "highest marks in the class scored by a student in that subject (in that class/group class)" individually in both the 'End-Semester examination' and 'Total Marks' in order to pass in that paper.

- Passing Criterion for B. Tech: minimum 40% of the highest marks in the class

Sample format for Indirect Assessment of Course outcomes

NAME: Premkumar Chithaluru
ENROLLMENT NO: NA
SAP ID: 40001082
COURSE: B.Tech
PROGRAM: DevOps

Please rate the following aspects of course outcomes DevOps Automation.
Use the scale 1-4*

Sl. No.		1	2	3	4
CO1	Learn Linux level basics like file permissions.				
CO2	Learn user groups and working with bash to create scripts.				
CO3	Building Delivery Pipelines and automating them.				
CO4	Understand RAD, MDD/MDA and Code Generation				
CO5	Compare advantages and disadvantages of automation.				

* 1 Below Average 3 Good

2 Average 4 Very Good