LECTURE PLAN

Institute/Department	UNIVERSITY INSTITUTE OF COMPUTING (UIC)	**Program**	**Master of Computer Applications - Cloud Computing and DevOps (MC307)**
Master Subject Coordinator Name:	Manisha Sharma	**Master Subject Coordinator E-Code**:	**E13416**
Course Name	Containerization with Docker	**Course Code**	**22CAH-742**

Lecture	Tutorial	Practical	Self Study	Credit	Subject Type
0	2	4	0	4.0	T

Course Type	Course Category	Mode of Assessment	Mode of Delivery
Major Elective	Graded (GR)	Hybrid	Hybrid (HYB)

Mission of the Department	M1.To provide innovative learning centric facilities and quality-oriented teaching learning process for solving computational problems. M2.To provide a framework through Project Based Learning to support society and industry in promoting a multidisciplinary activity. M3.To develop crystal clear evaluation system and experiential learning mechanism aligned with futuristic technologies and industry. M4. To provide doorway for promoting research, innovation and entrepreneurship skills in collaboration with industry and academia. M5.To undertake societal activities for upliftment of rural/deprived sections of the society
Vision of the Department	To be a Centre of Excellence for nurturing computer professionals with strong application expertise through experiential learning and research for matching the requirements of industry and society instilling in them the spirit of innovation and entrepreneurship.

Program Educational Objectives(PEOs)	
PEO1	Establish well-fortified foundational knowledge, learn, adapt and successfully bring to bear cloud computing approaches on changing societal and technological challenges.
PEO2	Undertake successful implementation of ethical solutions as an individual or a member or a leader of a team by investigating, analyzing, formulating and solving complex Cloud Architectural and DevOps problems in multidisciplinary approaches using modern tools.
PEO3	Enhance professionalism and ethical attitude in the profession while communicating with local, national and foreign peers, bound within regulations and leading to lifelong learning.
PEO4	Promote awareness for uplifting health, safety, legal, environmental, ethical and cultural diversity issues for serving the society.

Program Specific OutComes(PSOs)	
PSO1	Recognizing cloud computing algorithm construction, reviewing DevOps tools in the areas of Heuristics and Network Devices, and exhibiting the ability to function within multidisciplinary teams with intellectual ability in modern tool usage.
PSO2	Appeal valid conclusions, employ research-based knowledge and research methods consistent with economic reforms and use highly computational designs to supply ethical and responsible engineering services to society.

Program OutComes(POs)	
PO1	Apply mathematics and computing fundamental and domain concepts to find out the solution of defined problems and requirements. (Computational Knowledge)
PO2	Use fundamental principle of Mathematics and Computing to identify, formulate research literature for solving complex problems, reaching appropriate solutions. (Problem Analysis)
PO3	Understand to design, analyze and develop solutions and evaluate system components or processes to meet specific need for local, regional and global public health, societal, cultural, and environmental systems. (Design/Development of Solutions)
PO4	Use expertise research-based knowledge and methods including skills for analysis and development of information to reach valid conclusions. (Conduct Investigations of Complex Computing Problems)
PO5	Adapt, apply appropriate modern computing tools and techniques to solve computing activities keeping in view the limitations. (Modern Tool Usage)

PO6	Exhibiting ethics for regulations, responsibilities and norms in professional computing practices. (Professional Ethics)
PO7	Enlighten knowledge to enhance understanding and building research, strategies in independent learning for continual development as computer applications professional. (Life-long Learning)
PO8	Establishing strategies in developing and implementing ideas in multi- disciplinary environments using computing and management skills as a member or leader in a team. (Project Management and Finance)
PO9	Contribute to progressive community and society in comprehending computing activities by writing effective reports, designing documentation, making effective presentation, and understand instructions. (Communication Efficacy)
PO10	Apply mathematics and computing knowledge to access and solve issues relating to health, safety, societal, environmental, legal, and cultural issues within local, regional and global context. (Societal and Environmental Concern)
PO11	Gain confidence for self and continuous learning to improve knowledge and competence as a member or leader of a team. (Individual and Teamwork)
PO12	Learn to innovate, design and develop solutions for solving real life business problems and addressing business development issues with a passion for quality competency and holistic approach. (Innovation and Entrepreneurship)

Text Books

Sr No	Title of the Book	Author Name	Volume/Edition	Publish Hours	Years
1	Karl Matthias & Sean P. Kane, Docker: Up and Running, O'Reilly Publication.	Karl Matthias & Sean P. Kane	2nd	Tata McGraw Hill	2007
2	Len Bass, Ingo Weber, Liming Zhu, DevOps, A Software Architects Perspective, Addison-Wesley-Pearson	Len Bass, Ingo Weber, Liming Zhu	5th	Pearson Education	2005
3	John Ferguson Smart, Jenkins, The Definitive Guide, O'Reilly Publication.	John Ferguson	2nd	Chapman & Hall/CRC.	2006

Reference Books

Sr No	Title of the Book	Author Name	Volume/Edition	Publish Hours	Years
1	Sanjeev Sharma and Bernie Coyne,DevOps for Dummies, Wiley	Sanjeev Sharma and Bernie Coyne	1st	Calabrese Tom	2004
2	Httermann, Michael, DevOps for Developers,Apress Publication	Httermann, Michael	4th	Tata McGraw Hill	2007
3	Joakim Verona, Practical DevOps,Pack publication world	Joakim Verona Speciner, M	2nd	Prentice Hall PTR	2002

Course OutCome

SrNo	OutCome
CO1	Identify the importance of containerization in virtualization
CO2	Understand installation steps of Docker on Windows and Linux environments.
CO3	Analyze the containerization of OS images to deploy applications over Docker
CO4	Install applications on Kubernetes using Docker client.
CO5	Deploy Docker images as the stateless container.

Lecture Plan Preview-Theory

Unit No	LectureNo	ChapterName	Topic	Text/ Reference Books	Pedagogical Tool**	Mapped with CO Numer (s)
1	1	Introduction of Docker	Docker, Containerization	,T-Karl Matthias & Sean P. Kane, ,T-Len Bass, Ingo Weber, Liming Z,R-Sanjeev Sharma and Bernie Coyn	PPT	CO1

1	2	Introduction of Docker	Uses of container Virtualization, Difference between Docker and Virtual Machines	,T-Karl Matthias & Sean P. Kane, ,T-Len Bass, Ingo Weber, Liming Z,R-Sanjeev Sharma and Bernie Coyn	PPT	CO1
1	3	Introduction of Docker	Docker Architecture, Features, Components of Docker, Advantages	,T-John Ferguson Smart, Jenkins, ,T-Karl Matthias & Sean P. Kane, ,R-Httermann, Michael, DevOps for,R-Sanjeev Sharma and Bernie Coyn	PPT	CO1
1	4	Introduction of Docker	Installation of Docker, Docker Hub	,T-Karl Matthias & Sean P. Kane, ,T-Len Bass, Ingo Weber, Liming Z,R-Joakim Verona, Practical DevOp	PPT	CO2
1	5	Introduction of Docker	Containers and shell, Creating Docker images, backing	,T-John Ferguson Smart, Jenkins, ,T-Karl Matthias & Sean P. Kane, ,T-Len Bass, Ingo Weber, Liming Z,R-Joakim Verona, Practical DevOp	PPT	CO3
1	6	Introduction of Docker	Deploy, Login, Exit Container. List, Start, Stop and Restart	,T-Karl Matthias & Sean P. Kane, ,T-Len Bass, Ingo Weber, Liming Z,R-Sanjeev Sharma and Bernie Coyn	PPT	CO3
1	7	Introduction of Docker	Data Volumes and system Management	,T-John Ferguson Smart, Jenkins, ,T-Karl Matthias & Sean P. Kane, ,T-Len Bass, Ingo Weber, Liming Z,R-Sanjeev Sharma and Bernie Coyn	PPT	CO3
1	8	Introduction of Docker	Creating and mounting data volumes	,T-John Ferguson Smart, Jenkins, ,T-Karl Matthias & Sean P. Kane, ,T-Len Bass, Ingo Weber, Liming Z,R-Sanjeev Sharma and Bernie Coyn	PPT	CO3
1	9	Introduction of Docker	Defining Volumes in images	,T-John Ferguson Smart, Jenkins, ,T-Karl Matthias & Sean P. Kane, ,T-Len Bass, Ingo Weber, Liming Z,R-Sanjeev Sharma and Bernie Coyn	PPT	CO3
1	10	Introduction of Docker	Revision	,T-Karl Matthias & Sean P. Kane, ,R-Httermann, Michael, DevOps for	PPT	CO1
2	11	Docker components	Docker Compose and Compose installation	,T-Karl Matthias & Sean P. Kane, ,T-Len Bass, Ingo Weber, Liming Z,R-Sanjeev Sharma and Bernie Coyn	PPT	CO3
2	12	Docker components	Introduction to Docker Swarm	,T-Karl Matthias & Sean P. Kane, ,R-Sanjeev Sharma and Bernie Coyn	PPT	CO3
2	13	Docker components	Introduction to Docker Swarm	,T-Karl Matthias & Sean P. Kane, ,R-Sanjeev Sharma and Bernie Coyn	PPT	CO3
2	14	Docker components	Create Swarm, Maintain Swarm	,T-Len Bass, Ingo Weber, Liming Z,R-Joakim Verona, Practical DevOp	PPT	CO3
2	15	Docker components	Deploy Services to Swarm, Updates to Services, Managing Swarm Services	,T-John Ferguson Smart, Jenkins, ,T-Len Bass, Ingo Weber, Liming Z,R-Joakim Verona, Practical DevOp	PPT	CO3
2	16	Docker components	Docker Files, Building Files	,T-Karl Matthias & Sean P. Kane, ,T-Len Bass, Ingo Weber, Liming Z,R-Httermann, Michael, DevOps for	PPT	CO3
2	17	Docker components	Public repositories, Private Registry	,T-John Ferguson Smart, Jenkins, ,R-Sanjeev Sharma and Bernie Coyn	PPT	CO3

2	18	Docker components	Building Web server Docker file	T-Karl Matthias & Sean P. Kane, ,T-Len Bass, Ingo Weber, Liming Z	PPT	CO3
2	19	Docker components	Container Linking	,T-Karl Matthias & Sean P. Kane, ,R-Sanjeev Sharma and Bernie Coyn	PPT	CO3
2	20	Docker components	Revision	,T-John Ferguson Smart, Jenkins, ,T-Len Bass, Ingo Weber, Liming Z,R-Sanjeev Sharma and Bernie Coyn	PPT	CO3
3	21	Docker Storage, ring and Kubernetes	How to manage data in docker	,T-John Ferguson Smart, Jenkins, ,T-Karl Matthias & Sean P. Kane, ,R-Joakim Verona, Practical DevOp	PPT	CO5
3	22	Docker Storage, ring and Kubernetes	Types of storage available in docker, Multi Container environment	,T-Karl Matthias & Sean P. Kane, ,T-Len Bass, Ingo Weber, Liming Z,R-Httermann, Michael, DevOps for	PPT	CO5
3	23	Docker Storage, ring and Kubernetes	Docker volumes, Types of Volumes	,T-John Ferguson Smart, Jenkins, ,T-Karl Matthias & Sean P. Kane, ,T-Len Bass, Ingo Weber, Liming Z,R-Joakim Verona, Practical DevOp	PPT	CO5
3	24	Docker Storage, ring and Kubernetes	Container Network model, Default Bridge Network, User Created	,T-Karl Matthias & Sean P. Kane, ,T-Len Bass, Ingo Weber, Liming Z,R-Sanjeev Sharma and Bernie Coyn	PPT	CO5
3	25	Docker Storage, ring and Kubernetes	Host Network, Docker Cloud, Docker Log, Docker Compose,	,T-Karl Matthias & Sean P. Kane, ,R-Joakim Verona, Practical DevOp	PPT	CO4
3	26	Docker Storage, ring and Kubernetes	Continuous Integrations tools, Kubernetes architecture	,T-Len Bass, Ingo Weber, Liming Z,R-Httermann, Michael, DevOps for	PPT	CO4
3	27	Docker Storage, ring and Kubernetes	Introduction of kubernetes, Comparison of Docker and Kubernetes	,T-Karl Matthias & Sean P. Kane, ,R-Httermann, Michael, DevOps for	PPT	CO4
3	28	Docker Storage, ring and Kubernetes	Configuration of minikube on linux OS	,T-Karl Matthias & Sean P. Kane, ,T-Len Bass, Ingo Weber, Liming Z,R-Sanjeev Sharma and Bernie Coyn	PPT	CO4
3	29	Docker Storage, ring and Kubernetes	Installing Kubernetes using the Docker Client Running first app on Kubernetes	,T-Karl Matthias & Sean P. Kane, ,T-Len Bass, Ingo Weber, Liming Z,R-Sanjeev Sharma and Bernie Coyn	PPT	CO4
3	30	Docker Storage, ring and Kubernetes	Revision	,T-Karl Matthias & Sean P. Kane, ,R-Sanjeev Sharma and Bernie Coyn	PPT	CO4

Lecture Plan Preview-Practical

Unit No	ExperimentNo	Experiment Name	Text/ Reference Books	Pedagogical Tool**	Mapped with CO Numer(s)
1	1	Install Docker on Linux or windows	,T-Karl Matthias & Sean P. Kane, ,R-Sanjeev Sharma and Bernie Coyn	Simulation	CO1
1	2	Using docker CLI with commands	,T-Karl Matthias & Sean P. Kane, ,T-Len Bass, Ingo Weber, Liming Z,R-Sanjeev Sharma and Bernie Coyn	Simulation	CO1
1	3	Pulling Docker Images from Docker Hub	,T-Karl Matthias & Sean P. Kane, ,T-Len Bass, Ingo Weber, Liming Z,R-Httermann, Michael, DevOps for	Simulation	CO3
1	4	Pulling Docker Images from Docker Hub	,T-Karl Matthias & Sean P. Kane, ,R-Sanjeev Sharma and Bernie Coyn	Simulation	CO3

1	5	Deploying Docker images as Stateless Containers	,T-Karl Matthias & Sean P. Kane, ,R-Httermann, Michael, DevOps for	Simulation	CO3
1	6	Deploying Docker images as Stateless Containers	,T-John Ferguson Smart, Jenkins, ,T-Karl Matthias & Sean P. Kane, ,R-Httermann, Michael, DevOps for	Simulation	CO3
1	7	Managing Containers with the Docker CLI	,T-Karl Matthias & Sean P. Kane, ,T-Len Bass, Ingo Weber, Liming Z,R-Sanjeev Sharma and Bernie Coyn	Simulation	CO3
1	8	Managing Containers with the Docker CLI	,T-Karl Matthias & Sean P. Kane, ,R-Sanjeev Sharma and Bernie Coyn	Simulation	CO1,CO3
2	9	Understanding the Docker file for Customizing Imag	,T-Karl Matthias & Sean P. Kane, ,R-Sanjeev Sharma and Bernie Coyn	Simulation	CO3
2	10	Understanding the Docker file for Customizing Imag	,T-Karl Matthias & Sean P. Kane, ,T-Len Bass, Ingo Weber, Liming Z,R-Sanjeev Sharma and Bernie Coyn	Simulation	CO3
2	11	Building a Custom Docker Image for a Web Applicati	,T-Karl Matthias & Sean P. Kane, ,T-Len Bass, Ingo Weber, Liming Z,R-Httermann, Michael, DevOps for,R-Sanjeev Sharma and Bernie Coyn	Simulation	CO3
2	12	Building a Custom Docker Image for a Web Applicati	,T-Karl Matthias & Sean P. Kane, ,R-Sanjeev Sharma and Bernie Coyn	Simulation	CO3
2	13	Maintaining State with Docker Volumes	,T-Karl Matthias & Sean P. Kane, ,R-Httermann, Michael, DevOps for,R-Sanjeev Sharma and Bernie Coyn	Simulation	CO3,CO5
2	14	Maintaining State with Docker Volumes	,T-Karl Matthias & Sean P. Kane, ,R-Sanjeev Sharma and Bernie Coyn	Simulation	CO3
3	15	Working with Docker Compose	,T-Karl Matthias & Sean P. Kane, ,R-Sanjeev Sharma and Bernie Coyn	Simulation	CO3
3	16	Working with Docker Compose	,T-Karl Matthias & Sean P. Kane, ,T-Len Bass, Ingo Weber, Liming Z,R-Httermann, Michael, DevOps for,R-Sanjeev Sharma and Bernie Coyn	Simulation	CO3
3	17	Creating a Private Docker Image Repository	,T-Karl Matthias & Sean P. Kane, ,T-Len Bass, Ingo Weber, Liming Z,R-Httermann, Michael, DevOps for,R-Sanjeev Sharma and Bernie Coyn	Simulation	CO3,CO5
3	18	Creating a Private Docker Image Repository	,T-Karl Matthias & Sean P. Kane, ,T-Len Bass, Ingo Weber, Liming Z,R-Httermann, Michael, DevOps for,R-Sanjeev Sharma and Bernie Coyn	Simulation	CO1,CO3
3	19	Cleaning Up Old Containers and Docker Images	,T-Karl Matthias & Sean P. Kane, ,T-Len Bass, Ingo Weber, Liming Z,R-Httermann, Michael, DevOps for,R-Sanjeev Sharma and Bernie Coyn	Simulation	CO4,CO5
3	20	Cleaning Up Old Containers and Docker Images	,T-Karl Matthias & Sean P. Kane, ,T-Len Bass, Ingo Weber, Liming Z,R-Httermann, Michael, DevOps for,R-Sanjeev Sharma and Bernie Coyn	Simulation	CO1,CO5

Assessment Model			
Sr No	Assessment Name	Exam Name	Max Marks
1	20EP02	External Theory	60
2	20EP02	Attendance Marks	2
3	20EP02	Mid-Semester Test-1	20
4	20EP02	Quiz	6

5	20EP02	Short Term Paper / Research Paper	12
6	20EP02	Mid-Semester Test-2	20