Birla Institute of Technology & Science, Pilani
Work Integrated Learning Programmes
Course handout

Part A: Content Design

Course Title	Open Source Software Engineering
Course No(s)	
Credit Units	
Course Author	Ritu Arora
Version No	3.0
Date	December 27, 2020

Course Objectives:

No	Course Objective
CO1	To enable students to learn basic and advanced concepts in Open Source Software Engineering, as employed by the open-source community
CO2	To familiarize students with the open source movement, its philosophy and the history behind it
CO3	To provide a deeper understanding of various licensing issues associated with open source software and its societal, commercial, legal and philosophical origins and impacts
CO4	To enable students to understand open source process, its development methods, associated tools and communication mechanisms

Learning Outcomes:

No	Learning Outcome
LO1	Students will be able to understand and explain the nature of open source software, and the ways in which it differs from proprietary software
LO2	Students will be able to describe the concept of software licensing for open source software, distinguish between different types of licences, and be able to choose an appropriate license type keeping in mind the associated rules and regulations
LO3	Students will be able to understand agile development processes and use them to develop open source software by effectively collaborating with fellow student or community members
LO4	Students will be able to contribute to the development of open source software

The following advisory pre-requisites are not mandatory, however, student would benefit more if he/she has good knowledge of the

following courses:

- **Software Engineering or its equivalent**
- **Object Oriented Programming (with Java) or its equivalent**

Reference Books and Material:

R1	Producing Open Source Software: How to Run a Successful Free Software Project, 2nd edition, Karl Fogel
R2	Practical Open Source Software Exploration, Greg DeKoenigsberg, Chris Tyler, Karsten Wade, Max Spevack, Mel Chua, and Jeff Sheltren
R3	Getting Started With Open Source Software Development by Rachna Kapur, Mario Briggs, Tapas Saha, Ulisses Costa, Pedro Carvalho, Raul F. Chong, Peter Kohlmann; DB2 ON CAMPUS Book Series
R4	The Architecture of Open Source Applications, Volume I: Elegance, Evolution, and a Few Fearless Hacks by Amy Brown and Greg Wilson
R5	The Architecture of Open Source Applications, Volume II: Structure, Scale and a Few More Fearless Hacks by Amy Brown and Greg Wilson
Web References	
W1	Open Source Guides (https://opensource.guide/)
W2	Open Source Resources (https://opensource.com/)
W3	Working with GitHub for Open Source Software Development (https://github.com/)

Content Structure

Module No	List of Topic Title
M1	**Introduction to Open Source Software** • What is Open Source Software? • Principles of open source software • History and evolution of open source software • Free versus Open Software • Advantages vs Disadvantages of OSS • Open source culture and community
M2	**Open Source Business Model** • The Business of Open Source • Commercial and legal aspects of open source software • Intellectual Property Rights • Licensing models in OSS: GNU, Copyleft, Creative Commons • Choosing the right license

M3	**Lifecycle and methodologies in Open Source Software** • Open Source Software Development Process Model • Open Collaboration Model • Comparing OSS development methodologies with traditional methodologies
M4	**Contributing to Open Source Projects** • How to use/adapt the open source software ecosystem • FOSS and cross platform application development • Contribution models • Key characteristics of OSS projects • Key challenges in OSS projects • Starting your own Open Source Project • Managing distributed teams • Best practices in running an OSS project
M5	**Tools and Technologies in OSSE** • Collaboration Tools • Communication Tools • Source Code Management Tools • Run-time System Constraints
M6	**Working with Git/GitHub** • Getting source code • Updating your working copy • Examine your changes • Undoing working changes • Resolve Conflicts • Commit Changes • Debugging and Fixing code • Release Early, Release Often • Working with GitHub pages • Mastering Markdown
M7	**Understanding Open Source Projects (Case Study):** • Linux Project • sourceForge Project • Ruby on Rails Project • Kubernetes Project
M8	**Architecture of Open Source Applications** • Introduction to Scalable Web Architecture and Distributed Systems • Case Study - Eclipse - Selenium Web Driver - Moodle

Part B: Contact Session Plan

Academic Term	Second Semester 2020-2021
Course Title	Open Source Software Engineering
Course No	SE ZG587
Lead Instructor	RITU ARORA

Course Contents

Contact Session (2Hrs)	List of Topic Title (from content structure in Part A)	Text/Ref Book/external resource
CS1 CS2	**Introduction to Open Source Software** • What is Open Source Software? • Principles of open source software • History and evolution of open source software • Free versus Open Software • Advantages vs Disadvantages of OSS • Open source culture and community	R1, R2, R3
CS3	**Open Source Business Model** • The Business of Open Source • Commercial and legal aspects of open source software • Intellectual Property Rights • Licensing models in OSS: GNU, copyleft, creative commons • Choosing the right license	R1, R2, R3
CS4 CS5	**Lifecycle and methodologies in Open Source Software** • Open Source Software Development Process Model • Open Collaboration Model • Comparing OSS development methodologies with traditional methodologies	R1, R2, R3
CS6 CS7	**Contributing to Open Source Projects** • How to use/adapt the open source software ecosystem • FOSS and cross platform application development • Contribution models • Key characteristics of OSS projects • Key challenges in OSS projects • Starting your own Open Source Project • Managing distributed teams • Best practices in running an OSS project	R1, R2, R3, Web Resources
CS8	**Tools and Technologies in OSSE** • Collaboration Tools • Communication Tools • Source Code Management Tools • Run-time System Constraints	R1, R2, R3, Web Resources

CS9 CS10 CS11 CS12	**Working with Git/GitHub** • Getting source code • Updating your working copy • Examine your changes • Undoing working changes • Resolve Conflicts • Commit Changes • Debugging and Fixing code • Release Early, Release Often • Working with GitHub pages • Mastering Markdown	Web Resources
CS13 CS14	**Understanding Open Source Projects (Case Study):** • sourceForge Project • Ruby on Rails Project	R3, Web Resources
CS15 CS16	**Architecture of Open Source Applications** • Introduction to Scalable Web Architecture and Distributed Systems • Case Study - Eclipse - Selenium Web Driver - Moodle	R4, R5

Detailed Plan for Experiential Learning Components

Lab No	Lab Objective	Lab Sheet Access URL	Content Reference
1.	Working with GitHub The aim of this lab sheet is to develop an understanding about the basic environment and workflow of GitHub. It also guides the students to create a repo on GitHub and initialize it with some relevant files. Additionally, it helps students to familiarize themselves with the various open source projects available on GitHub and navigate through them. Technologies used: GitHub.com		
2.	Using GitHub and GitHub Desktop for contributing to Open Source Projects The aim of this lab sheet is to guide the student to develop an understanding of the simple process in which one can contribute to open source projects hosted on GitHub and also provides a hands-on on the same. Technologies used: GitHub.com, GitHub Desktop		
3.	Using Eclipse to contribute to Open Source Java Projects hosted over GitHub The aim of this lab sheet is to guide the students to be able to configure and use Eclipse IDE to work with Java project repositories hosted over GitHub. Technologies used: GitHub.com, Eclipse IDE		
4.	Working with Git The aim of this lab sheet is to develop an understanding of the		

	basic Git commands used for uploading, cloning, committing and pushing content to GitHub. Technologies used: GitHub.com, Git		

Evaluation Components

No	Name	Type	Duration	Weight	Day, Date, Session, Time
EC-1	Quiz-I	Online		5%	February 1-15, 2021
	Quiz-II	Online		5%	March 1-15, 2021
	Assignment I / Project – Phase I	Online		5%	April 1-15, 2021
	Assignment-II / Project – Phase II	Online		10%	To be announced
EC-2	Mid-Semester Exam	Open Book	2 Hours	30%	Friday, 05/03/2021 (FN) 10 AM - 12 Noon
EC-3	Comprehensive Exam	Open Book	2 Hours	45%	Friday, 30/04/2021 (FN) 10 AM - 12 Noon

Note *- Evaluation components can be tailored depending on the proposed model.*

Important Information:

Evaluation Guidelines:

1. For Closed Book tests: No books or reference material of any kind will be permitted. Laptops/Mobiles of any kind are not allowed. Exchange of any material is not allowed.
2. For Open Book exams: Use of prescribed and reference text books, in original (not photocopies) is permitted. Class notes/slides as reference material in filed or bound form is permitted. However, loose sheets of paper will not be allowed. Use of calculators is permitted in all exams. Laptops/Mobiles of any kind are not allowed. Exchange of any material is not allowed.
3. If a student is unable to appear for the Regular Test/Exam due to genuine exigencies, the student should follow the procedure to apply for the Make-Up Test/Exam. The genuineness of the reason for absence in the Regular Exam shall be assessed prior to giving permission to appear for the Make-up Exam. Make-Up Test/Exam will be conducted only at selected exam centres on the dates to be announced later.

It shall be the responsibility of the individual student to be regular in maintaining the self-study schedule as given in the course handout, attend the lectures, and take all the prescribed evaluation components such as Assignment/Quiz, Mid-Semester Test and Comprehensive Exam according to the evaluation scheme provided in the handout.