University of Engineering and Management

Institute of Engineering & Management, Salt Lake Campus

Institute of Engineering & Management, New Town Campus

University of Engineering & Management, Jaipur

5th Semester Syllabus for BCA Admission Batch 2022

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Syllabus Structure:

BCA 3rd Year Course Structure: 2022 – Odd Semester

BCA 2022 Course structure									
SEMESTER 5									
SL NO	**TYPES OF COURSE**	**SUB CODE**	**SUB NAME**	**L**	**T**	**P**	**S**	**TOTAL CONTACT HRS**	**CREDIT POINTS**
THEORY									
1	Computer Science & Application	BCACC501	Unix and Shell programming	3	1	0	0	4	4
2	Computer Science & Application	BCACC502	Software Engineering	3	1	0	0	4	4
3	Computer Science & Application	BCACC503	Machine Learning with Python	3	1	0	0	4	4
4	Value Added Course	BCA(GS)501	GENERAL STUDIES & CURRENTAFFAIRS-V	4	0	0	0	4	2
PRACTICAL									
5	Computer Science & Application	BCACC591	Unix and Shell programming Lab	0	0	4	0	4	2
6	Computer Science & Application	BCACC593	Machine Learning lab with Python	0	0	4	0	4	2
SESSIONAL									
7	Skill Enhancement	BCA(GS)581	Competitive Aptitude Training-V	0	0	0	2	4	2
8	Skill Enhancement	BCASE501	Industrial Training & Minor Project	0	0	0	2	1	2
9	Multidisciplinary	BCAMD581	Cyber Security	0	0	0	2	1	2
MOOCS/MAR/IFC									
10	Value Added Course	MOOCs	Massive Open Online Course	0	0	0	0	0	0
11	Value Added Course	IFC	Industry and foreign certification	0	0	0	0	0	0
12	Value Added Course	MAR	Mandatory Additional Requirements(MAR)	0	0	0	0	0	0
								30	24

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Syllabus for BCA Admission Batch 2022

Subject Name: Unix & Shell Programming Credit:3 Lecture Hours: 40
Subject Code: BCACC501

Pre-requisite: Knowledge of basic Operating System Concept

Relevant Links:

Study Materials Coursera LinkedIn Learning

COURSE OBJECTIVES:

1. To get an idea to demonstrate an ability to use and control features of UNIX like OS as administrator
2. To build ability in applying various simple commands, filters and advanced filters
3. To identify shell programming knowledge that applies to a given problem
4. To be able to do user management and system administration in UNIX environment

COURSE OUTCOMES:

On completion of the course students will be able to

CO 1: Understand the various concepts of UNIX and UNIX like operating systems.

CO 2: Run basic commands to control the Unix like environment.

CO 3: Applying shell programming skills to solve problems.

CO 4: Acquire the knowledge of system administration and security of OS.

Module number	Topic	Chapter Name	Sub-topics	Mapping with Industry and International Academia	Lecture Hours
1	**Getting Started** **General Purpose Utilities** **The File System**	**UNIX-Concepts& Applications, Sumitava Das, TMH.(Chapter 1, Chapter 4, Chapter 5, Chapter 6,Chapter 7)**	**Chapter 1** 1.1 The Operating System 1.2 The UNIX Operating System 1.3 Knowing your machine 1.4 A brief session 1.5 Conclusion **Chapter 4** 4.1 **cal** : The calender 4.2 **date** : Displaying the system date 4.3 **echo** : Displaying the message 4.5 **bc** : The calculator 4.7 **passwd**: changing your password 4.8 **who** : who are the users 4.9 **uname**: knowing your machines characteristics. 4.10 **tty** : knowing your terminal. **Chapter 5** 5.1 The File 5.2 What's in a (File) Name. 5.3 The Parent-Child relationship 5.4 The HOME variable:	***International Academia:*** (https://www.coursera.org/learn/linux-for-developers) ***Industry Mapping:*** RedHat Enterprise Linux, Ubuntu, Fedora Linux	10

	Handling Ordinary Files **Basic File Attributes**		the home directory. 5.5 **pwd** : checking your current directory 5.6 **cd** : changing the current directory 5.7 **mkdir** : making directories 5.8 **rmdir** : removing directories 5.9 Absolute pathnames 5.10 Relative pathnames 5.11 ls : listing directory contents 5.12 The UNIX file system **Chapter 6** 6.1 **cat** : Displaying and creating files 6.2 **cp** : Copying a file 6.3 **rm** : Deleting files 6.4 **mv** : Renaming files 6.5 **more** : Paging output 6.7 **file**: Knowing the file types 6.8 **wc** : Counting lines,words and characters. 6.10 **cmp** : Comparing two files 6.15 **gzip** and **gunzip** : Compressing and Decompressing files 6.16 **tar** : The archival program		

			Chapter 7 7.1 **ls –l** : Listing file attributes 7.2 File ownershinp 7.4 File permissions 7.5 **chmod** :Changing file permission 7.6 Directory permissions 7.7 Changing file ownership 7.8 Conclusion		
2	**The Shell** **The Process** **More File Attributes**	**UNIX-Concepts& Applications, Sumitava Das, TMH.(Chapter 9, Chapter 10, Chapter 13)**	**Chapter 9** 9.1 The Shell's interpretive cycle 9.3 Pattern matching the wild card 9.4 Escaping and Quoting 9.6 /dev/null and /dev/tty: Two special files **Chapter 10** 10.1 Process basics 10.2 ps: process status 10.4 Mechanism of Process Creation 10.5 Internal and External Command 10.6 Running Jobs in Background **Chapter 13**	***International Standards:*** (https://www.coursera.org/learn/linux-for-developers) (https://www.coursera.org/learn/linux-and-bash-for-data-engineering-duke) ***IndustryMapping:*** RedHat Enterprise Linux, Ubuntu, Fedora Linux	10

			13.1 File Systems and Inodes 13.2 Hard links 13.3 Symbolic links and ln		
3	**Simple Filters** **Filters using Regular Expressions- grep and sed**	**UNIX-Concepts& Applications, Sumitava Das, TMH.(Chapter 14, Chapter 15)**	**Chapter 14** 14.1 The Sample Database 14.2 pr: paginating Files 14.3 head: Displaying the Beginning of a File 14.4 tail: Displaying the End of a File 14.5 cut: Slitting a File Vertically 14.6 paste: Pasting Files 14.7 sort: Ordering a File 14.8 uniq: Locate Repeated and Nonrepeated Lines 14.9 tr: Translating Characters **Chapter 15** 15.1 grep: Searching for a Patter 15.2 Basic Regular Expression 15.3 Extended Regular Expression (ERE) and egrep 15.4 sed: The Stream Editor 15.5 Line Addressing 15.6 Using Multiple Instructions (-e and -f) 15.7 Context Addressing	***International Standards:*** (https://www.coursera.org/learn/linux-for-developers) ***Industry Mapping :*** RedHat Enterprise Linux, Ubuntu, Fedora Linux	10

			15.8 Writing Selected Lines to a File (w)		
4	**EssentialShell Programming** **Essential System Administration** **awk-An advanced filter**	**UNIX-Concepts& Applications, Sumitava Das, TMH.(Chapter 16, Chapter 17, Chapter 21)**	**Chapter 16** 16.1 Shell Scripts 16.2 read: Making Scripts Interactive 16.5 The Logical Operators && and || 16.6 the if Condition 16.7 Using test and [] to Evaluate Expressions 16.8 The case Condition 16.9 expr 16.11 While 16.12 for **Chapter 17** 17.1 root: The system administrator's login 17.2 The administrator's privileges 17.3 Maintaining security 17.4 User management 17.5 Startup and shutdown 17.6 Managing Disk Space 17.7 Device files 17.9 cpio 17.10 tar **Chapter 21**	***International Standards:*** *(*https://www.coursera.org/learn/linux-for-developers) **(**https://www.coursera.org/learn/linux-and-bash-for-data-engineering-duke**)** ***Industry Mapping: Industry Mapping:*** RedHat Enterprise Linux, Ubuntu, Fedora Linux	10

			21.1 Simple **awk** filtering.		

TEXT BOOK:

1. **UNIX-Concepts & Applications, Sumitava Das, TMH.**

REFERENCE BOOKS:

1. **UNIX Shell Programming,Yashavant Kanetkar,BPB Publications.**
2. **Essentials Systems Administration, Frisch, SPD/O'REILLY"**

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Syllabus for BCA Admission Batch 2022

Subject Name: **Software Engineering** Credit : 4 Lecture Hours: 40
Subject Code: **BCACC502**

Pre-requisite: Knowledge of basic programming, algorithm and database.

RelevantLinks:

Study Materials Coursera LinkedIn Learning Infosys Springboard

COURSEOBJECTIVES:

1. To apply software engineering lifecycle for planning, analysis, design, construction and deployment of a project.
2. To demonstrate an understanding of and apply current theories, models, and techniques that provides a basis for the software lifecycle.
3. To demonstrate an ability to use the techniques and tools necessary for engineering practice
4. To gain the knowledge of how Analysis, Design, Implementation, Testing and Maintenance processes are conducted in a software project.

COURSE OUTCOMES:

CO1: Decomposing the given project in various phases of a lifecycle.
CO2: Selecting appropriate process model depending on the user requirements.
CO3: Performing various life cycle activities like Analysis, Design, Implementation, Testing and Maintenance.
CO4: Applying the knowledge, techniques, and skills in the development of a software product.

Module number	Topic	Chapter Name	Sub-topics	MappingwithIndustryand International Academia	
1	**Introduction & Software Lifecycle Models**	Fundamentals of Software Engineering (Fifth Edition), Rajib Mall **(Chapter-1)**	**1.2** Software Development Projects **1.3** Emergence of Software Engineering **1.5** Notable changes in Software Development Practices **1.6** Computer System Engineering Book: Fundamentals of Software Engineering (Fifth Edition), Rajib Mall **(Chapter 2)** **2.1** A few Basic Concepts **2.2** Waterfall Model and its extension **2.5** Spiral Model **2.6** A comparison of Different Life Cycle Models	***International Academia:*** https://ocw.mit.edu/courses/16-355j-software-engineering-concepts-fall-2005/resources/cnotes1/ https://ocw.mit.edu/courses/16-355j-software-engineering-concepts-fall-2005/resources/cnotes2/ ***IndustryMapping:*** Notion	5
2	**Software Project Management & Requirement Analysis and Specification**	Fundamentals of Software Engineering (Fifth Edition), Rajib Mall **(Chapter 3)**	**3.1** Software Project Management Complexities **3.2** Responsibilities of a Software Project Manager **3.7** COCOMO-A Heuristic Estimation Technique **3.10** Scheduling Book: Fundamentals of Software Engineering (Fifth Edition), Rajib Mall **(Chapter 4)** **4.2** Software Requirement Specification(SRS)	***International Standards:*** https://ocw.mit.edu/courses/16-355j-software-engineering-concepts-fall-2005/resources/cnotes3/ ***IndustryMapping:*** Gantt Project	10

3	**Software Design & Function Oriented Software Design):**	Fundamentals of Software Engineering (Fifth Edition), Rajib Mall **(Chapter 5)**	**5.1** Overview of the Design Process **5.2** How to characterize a good software design? **5.3** Cohesion and Coupling **5.5** Approaches to Software Design Book: Fundamentals of Software Engineering (Fifth Edition), Rajib Mall **(Chapter 6)** **6.2** Structured Analysis **6.3** Developing the DFD Model of a System **6.4** Structured Design	***International Standards:*** https://ocw.mit.edu/courses/16-355j-software-engineering-concepts-fall-2005/resources/cnotes4/ https://ocw.mit.edu/courses/16-355j-software-engineering-concepts-fall-2005/resources/cnotes5/ ***IndustryMapping:*** smartdraw	10
4	**Object Modeling using UML & User Interface Design**	Fundamentals of Software Engineering (Fifth Edition), Rajib Mall **(Chapter 7)**	7.1 Basic Object Oriented Concepts 7.2 Unified Modelling Language 7.3 UML Diagrams 7.4 Use Case Model 7.5 Class Diagrams Book: Fundamentals of Software Engineering (Fifth Edition), Rajib Mall **(Chapter 9)** 9.1 Characteristics of a Good User Interface 9.2 Basic Concepts 9.3 Types of User Interfaces	***International Standards:*** https://ocw.mit.edu/courses/1-264j-database-internet-and-systems-integration-technologies-fall-2013/resources/mit1_264jf13_lect_7/ ***IndustryMapping:*** ***IndustryMapping:*** Visual Paradigm	10
5	**Coding and Testing & Software Reliability and Quality Management &**	Fundamentals of Software Engineering (Fifth Edition), Rajib Mall **(Chapter 10)** Fundamentals of Software Engineering	10.1 Coding 10.3 Software Documentation 10.4 Testing 10.6 Black-Box Testing 10.7 White- Box Testing	***International Standards:*** *https://ocw.mit.edu/courses/16-355j-software-engineering-concepts-fall-2005/resources/cnotes8/* *https://ocw.mit.edu/courses/16-355j-software-engineering-concepts-fall-*	5

	Computer Aided Software Engineering	(Fifth Edition), Rajib Mall **(Chapter 11)**	11.1. Software Reliability 11.4 Software Quality Management System Book: Fundamentals of Software Engineering (Fifth Edition), Rajib Mall **(Chapter 12** 12.1 CASE and its scope 12.2 CASE Environment 12.3 CASE Support in Software Life Cycle	*2005/resources/cnotes7/* ***Industry Mapping:*** Avo Assure	

TEXTBOOK:

1. Fundamentals of Software Engineering (Fifth Edition), Rajib Mall
2. Software Engineering , Rogers G. Pressman, TMH

REFERENCEBOOKS:

1. Software Engineering, Ghezzi,2nd Ed, PHI

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Syllabus for BCA Admission Batch 2023

Subject Name: **Machine Learning with Python** Credit: 4 Lecture Hours: 40
Subject Code: **BCACC502**

Pre-requisite: Python programming language.

Relevant Links:

Study material | Linkedin Learning | Coursera | NPTEL

COURSE OBJECTIVES:

Throughout the course, students will be expected to demonstrate their understanding of Machine Learning concepts and algorithms by being able to do each of the following:

1. To apply fundamental concepts of Python Programming & sklearn library for problem solving
2. To understand the fundamentals of different ML algorithms along with their parameters.
3. To understand and apply and work with pandas dataframe ,numpy sklearn
4. To apply logical reasoning to design programs using ML models using python modules and packages.

COURSE OUTCOMES:

CO1: Understand the importance and basic concepts of Python Programming & sklearn library for problem solving .
CO2: To understand basic concepts of different supervised learning algorithms.
CO3: To get familiarize and understand basic concepts of different unsupervised learning algorithms.
CO4: Understand some basic properties of Preprocessing of Data.

Module number	Topic	Chapter Name	Sub-Topics	Mapping with Industry and International Academia	Lecture Hours
1	Introduction	**Machine Learning By Amit Kumar Das Chapter 1**	Why Machine Learning? Problems Machine Learning Can Solve, Knowing Your Task and Knowing Your Data ,Why Python? scikit-learn, Installing scikit-learn ,Essential Libraries and Tools , Jupyter Notebook NumPy ,SciPy , matplotlib ,pandas,mglearn, First Application	International Standards: https://openlearninglibrary.mit.edu/courses/course-v1:MITx+6.036+1T2019/courseware/Week1/intro_ml/?activate_block_id=block-v1%3AMITx%2B6.036%2B1T2019%2Btype%40sequential%2Bblock%40intro_ml/ Industry Mapping: TensorFlow PyTorch: scikit-learn: NumPy and) ,Pandas	10

2	Supervised Learning 1	**Machine Learning By Amit Kumar Das Chapter 7**	Classification and Regression, Generalization, Overfitting, and Underfitting, Relation of Model Complexity to Dataset Size, Supervised Machine Learning Algorithms, Some Sample Datasets,k-Nearest Neighbors, Linear Models,Naive Bayes Classifiers	International Standards: 1. https://openlearninglibrary.mit.edu/courses/course-v1:MITx+6.036+1T2019/courseware/Week13/non_parametric/?activate_block_id=block-v1%3AMITx%2B6.036%2B1T2019%2Btype%40sequential%2Bblock%40non_parametric/ Industry Mapping TensorFlow PyTorch: scikit-learn: NumPy and ,Pandas Jupyter Notebooks Engineering, Prompt	10
3	Supervised Learning 2	**Machine Learning By Amit Kumar Das Chapter 7,8**	Decision Trees,Ensembles of Decision Trees ,Kernelized Support Vector Machines ,Neural Networks (Deep Learning) ,Uncertainty Estimates from	International Standard: https://www.edx.org/learn/machine-learning/massach	10

			Classifiers ,The Decision Function , Predicting Probabilities ,Uncertainty in Multiclass Classification.	usetts-institute-of-technology-machine-learning-with-python-from-linear-models-to-deep-learning/ Industry mapping: BI, Jupyter Notebook	
4	Unsupervised Learning	**Machine Learning By Amit Kumar Das Chapter 9**	Types of Unsupervised Learning, Challenges in Unsupervised Learning, Preprocessing and Scaling, Different Kinds of Preprocessing,Applying Data Transformations, Scaling Training and Test Data the Same Way,The Effect of Preprocessing on Supervised Learning, Clustering ,k-Means Clustering, Summary of Clustering Methods	International Standard: 1.https://www.edx.org/learn/machine-learning/massachusetts-institute-of-technology-machine-learning-with-python-from-linear-models-to-deep-learning/ Industry mapping: BI, Jupyter Notebook	10

TEXTBOOK:

1. **AMIT KUMAR DAS, SAIKAT DUTT, SUBRAMANUIM CHANDRAMOULI, MACHINE LEARNING, PEARSON, ISBN 978-93-530-6669-7 .**

REFERENCEBOOKS:

1. **Andreas C. Müller and Sarah Guido, Introduction to Machine Learning with Python A Guide for Data Scientists, FIFTH Edition . SPD Books,** Download eBook

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Syllabus for BCA Admission Batch 2023

Subject Name: **Cyber Security** Credit: 4 Lecture Hours: 40
Subject Code: BCAD501A

Relevant Links:

Study material LinkedinLearning Coursera NPTEL

COURSE OBJECTIVES:

Throughout the course, students will be expected to understand the concept of Cyber Security by :

1. Developing an overall understanding of defending data in cyberspace
2. Developing an understanding of different protocols, cyber crimes, cyber laws and vulnerabilities in digital world.
3. Developing an understanding of how to stay secure amidst cyber threats and malware attacks.

COURSE OUTCOMES:

CO1: Understand the various concepts of underlying computer network and probable threats
CO2: Apply these techniques in applications to see the real-life security mechanisms in the cyber world.
CO3: Explain the role of anti-malware programs in combating cyber threats.
CO4: Acquire the basic knowledge of real-world hacking

Module number	Topic	Chapter Name	Sub-Topics	Lecture Hours
1	**Module 1:Network Layer and Applicati on Layer**	**Behrouz A. Forouzan., Data Communications & Networking, 4th Edition, Tata McGraw-Hill Chapter 18,19,20, 22**	IPv4 Addresses, IPv6 Addresses, Network layer: Delivery, Forwarding and Delivery, Delivery, forwarding, unicast routing protocols, multicast routing protocols, Remote logging, electronicmail and file transfer, Remote logging, Electronic mail, File transfer, WWW and HTTP	10
2	**Module 2:Cryptography and Network Security**	**Behrouz A. Forouzan., Data Communications & Networking, 4th Edition, Tata McGraw-Hill Chapter 31,32**	Cryptography, Symmetric Key cryptography, Asymmetric Key cryptography, Network Security, Security Service :Message Confidentiality, Message Integrity, Message Authentication, Digital Signature, Entity Authentication, Key	10

			Management	
3	**Module 3:Introduction to Cyber Security**	**Fundamentals of Cyber Security By manyank Bhusan Chapter 5,6**	**Information Security:** What is Security? Why Information Security is Important?Threats to Information systems, Security Threat Source, Internal threats, External Threats, Cyber Security and Securityrisk analysis **Application Security**: Database security, E-mail SecurityInternet Security **Security Threats** Virus, Worms, Trojan Horse, Bombs, Trap Door E-mail spoofingE-mail Virus, Virus Life-Cycle, How Virus Works? Macro Viruses, Malicious	10

			Software, Network and Services Attack Denial-of-Service Attack, Types of DOS Attacks Methods of attacks.	
4	**Module 4:Information Security Standards**	**Fundamentals of Cyber Security By manyank Bhusan** **Chapter 8**	What is ISO?,IT Act 2000Copyright,Patent,Intellectual PropertyRights Cyber Laws in India, Software Licensing **Introduction to Ethical Hacking** Ethics Terminology, The Ethical Hacker, Security and HackingFoundation of Security – C.A.I.A, Phases of Ethical Hacking, Hacking Technologies, Phase of Ethical Hacking: Reconnaissance, Scanning, Gaining Access Maintaining Access Covering Tracks, Hacker Classes: Black Hats, White Hats, Gray Hats	10

Learning Resources:

TEXTBOOK:

1. **Behrouz A. Forouzan., Data Communications & Networking, 4th Edition, Tata McGraw-Hill.**
2. **MayankBhushan, Fundamentals ofCyber Security, BPB Publications.**

REFERENCEBOOKS:

1. **William Manning, Certified Ethical Hacker Certification Exam, A comprehensive Approach, ISBN: 9781447611059.**