University of Mumbai

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CIRCULAR:-
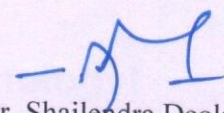
Sub :- P.G Diploma in Block Chain Technology (PGDBCT).

Ref :- RB/MU-2022/CR-255/Edn-5/1290, dated 01ˢᵗ November, 2022.

All the Principals of the Affiliated Colleges, the Head of the University Department and Directors of the recognized Institutions in Faculty of Science & Technology are hereby informed that the recommendations made by the **Ad-hoc Board of Studies in Information Technology** at its online meeting held on **06ᵗʰ April, 2022** vide item No. **3** and subsequently passed in the faculty of Science & Technology and then by the Board of Deans at its online meeting held on **5ᵗʰ July, 2022** vide item No. **6.9(N)** have been accepted by the Academic Council at its meeting held on **11ᵗʰ July, 2022,** vide item No. **6.9 (N)** and subsequently approved by the Management Council at its meeting held on **28ᵗʰ July, 2022** vide item No. **8** and that in accordance therewith, in exercise of the powers conferred upon the Management Council under Section 74(4) of the Maharashtra Public Universities Act, 2016 (Mah. Act No. VI of 2017) the Ordinance **6827 & 6828** Regulations **9613 to 9616** and the syllabus of **P.G. Diploma in Block Chain Technology (PGDBCT)** has been introduced and the same have been brought into force with effect from the academic year **2022-23**, accordingly. (The same is available on the University's website www.mu.ac.in).

MUMBAI – 400 032
07ᵗʰ November, 2022

(Dr. Shailendra Deolankar)
I/c. REGISTRAR

To,

The Principals of the Affiliated Colleges, the Head of the University Department and Directors of the recognized Institutions in Faculty of Science & Technology.

A.C/6.9(N)/11/7/2022
M.C/8/28/7/2022

Copy forwarded with Compliments for information to:-
1) The Chairman, Board of Deans
2) The Dean, Faculty of Science & Technology,
3) The Chairman, Ad-hoc Board of Studies in Information Technology,
4) The Director, Board of Examinations and Evaluation,
5) The Director, Board of Students Development,
6) The Director, Department of Information & Communication Technology,
7) The Co-ordinator, MKCL.

Copy to :-

1. The Deputy Registrar, Academic Authorities Meetings and Services (AAMS),
2. The Deputy Registrar, College Affiliations & Development Department (CAD),
3. The Deputy Registrar, (Admissions, Enrolment, Eligibility and Migration Department (AEM),
4. The Deputy Registrar, Research Administration & Promotion Cell (RAPC),
5. The Deputy Registrar, Executive Authorities Section (EA),
6. The Deputy Registrar, PRO, Fort, (Publication Section),
7. The Deputy Registrar, (Special Cell),
8. The Deputy Registrar, Fort/ Vidyanagari Administration Department (FAD) (VAD), Record Section,
9. The Director, Institute of Distance and Open Learning (IDOL Admin), Vidyanagari,

They are requested to treat this as action taken report on the concerned resolution adopted by the Academic Council referred to in the above circular and that on separate Action Taken Report will be sent in this connection.

1. P.A to Hon'ble Vice-Chancellor,
2. P.A Pro-Vice-Chancellor,
3. P.A to Registrar,
4. All Deans of all Faculties,
5. P.A to Finance & Account Officers, (F.& A.O),
6. P.A to Director, Board of Examinations and Evaluation,
7. P.A to Director, Innovation, Incubation and Linkages,
8. P.A to Director, Board of Lifelong Learning and Extension (BLLE),
9. The Director, Dept. of Information and Communication Technology (DICT) (CCF & UCC), Vidyanagari,
10. The Director of Board of Student Development,
11. The Director, Department of Students Walfare (DSD),
12. All Deputy Registrar, Examination House,
13. The Deputy Registrars, Finance & Accounts Section,
14. The Assistant Registrar, Administrative sub-Campus Thane,
15. The Assistant Registrar, School of Engg. & Applied Sciences, Kalyan,
16. The Assistant Registrar, Ratnagiri sub-centre, Ratnagiri,
17. The Assistant Registrar, Constituent Colleges Unit,
18. BUCTU,
19. The Receptionist,
20. The Telephone Operator,
21. The Secretary MUASA

for information.

University of Mumbai

Syllabus for

(P.G. Diploma in Block Chain Technology)

(PGDBCT)

(Introduced from the academic year 2022-23)

University of Mumbai

Syllabus for Approval

O: 6827	Title of Course	P.G. Diploma in Block Chain Technology (PGDBCT)
O: 6828	Eligibility	Under graduate in any faculty from recognized University with minimum 40 % of passing in aggregate (knowledge of computer is Preferable).
R: 9613	Duration of Course	1 year
R: 9614	Intake Capacity	30
R: 9615	Scheme of Examination	Sem I – 6 courses with Internal – 40 External - 60 Practical – 50 Sem II – 5 courses with Internal – 40 External - 60 Practical – 50 One course of project
R: 9616	Standards of Passing	Minimum 40% of passing in each component of internal, external, practical and project
No. of years/Semesters:		1 Years, 2 Semesters
Level:		P.G. / U.G./ Diploma / Certificate (Strike out which is not applicable)
Pattern:		Yearly / Semester (Strike out which is not applicable)
Status:		Revised / New (Strike out which is not applicable)
To be implemented from Academic Year :		From Academic Year: 2022-23

Date:

Signature:
Name: Dr. (Mrs.) R. Srivaramangai
Chairman of Ad-hoc BoS in
Information Technology

Signature:
Dr. Anuradha Majumdar
Dean, Science and Technology

PGDBCT102	Fundamentals of Web Programming	2	PGDBCT1P2	2
PGDBCT103	Linux Operating System	2	PGDBCT1P3	2
PGDBCT104	Data Structures and Algorithms	2	PGDBCT1P4	2
PGDBCT105	Software Engineering	2	PGDBCT1P5	2
PGDBCT106	Introduction to Block Chain	2	PGDBCT1P6	2

Semester II

Theory			Practical	
Course Code	Course Name	Credits	Course Code	Credits
PGDBCT201	Ethereum and Solidity	2	PGDBCT2P1	2
PGDBCT202	Smart Contracts with Ethereum	2	PGDBCT2P2	2
PGDBCT203	Blockchain with Hyperledger	2	PGDBCT2P3	2
PGDBCT204	Building Projects with Blockchain	2	PGDBCT2P4	2
PGDBCT205	Building Dapps with Ethereum	2	PGDBCT2P5	2
PGDBCT206	Project	4		

All practical will be based on the concepts in theory and the department has the freedom of framing and updating the practical list as and when required.

SEMESTER I

PGDBCT101:

P. G. Diploma in Block Chain Technology (PGDBCT)		Semester – I	
Course Name: Programming with Python		**Course Code: PGDBCT101**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2	40
	Internal	--	60

Course Objectives:

Course Objectives: Upon the successful completion of this course, the student will be able to:
- Learn Programming fundamentals using Python
- Understand the concepts and usage data types, variables and other basic elements
- Learn about using operators and control statements and exception handling in Python
- Develop modular programs using functions and implement object oriented concepts
- Learn about GUI programming, text processing and file operations
- Introduce blockchain Tools and plot data using appropriate Python visualization libraries

Unit	Details	Lectures
I	**Introduction to Python Language**: Overview, Features of Python, Execution of a Python Program, Innards of Python, Frozen Binaries, Python Interpreter, Comparison of Python with C and Java, Installing Python, Writing & Executing, IDLE **Data Types, Variables And Other Basic Elements**: Comments, Docstrings, Data types-Numeric, Compound, Boolean, Dictionary, Sets, Mapping, Basic Elements of Python, Variables **Input and Output Operations**: Input Function, Output Statements, Command Line Arguments **Control Statements:** Control Statements- Loop Statement, The else Suite, break Statement, continue Statement, pass Statement, assert Statement, return Statement	10
II	**Functions**: Defining & Calling a Function, Returning Results, Returning Multiple Values, Built-in Functions, Parameters and Arguments, Recursive Functions, Anonymous or Lambda Functions **Operators**: Arithmetic operators, Assignment operators, Unary minus operator, Relational operators, Logical operators, Bitwise operators, Membership operators, Identity operators, Precedence of Operators, Associativity of Operators **Arrays**: Creating Arrays, Indexing and Slicing, Basic Array Operations, Arrays Processing, Mathematical Operations on Array, Aliasing Arrays, Slicing and Indexing in NumPy Arrays, Basic Slicing. Advanced Indexing. Dimensions of Arrays, Attributes of an Array **Strings**: Creating Strings, Functions of Strings, Working with Strings, Length of a String, Indexing & Slicing, Repeating & Concatenation of Strings, Checking Membership, Comparing Strings, Removing Spaces,	10

	Finding Substrings, Counting Substrings, Strings are Immutable, Splitting and Joining Strings, Changing Case, Checking Starting and Ending of a String, Sorting & Searching in the Strings, Formatting the Strings, Working with Characters	
III	**Lists and Tuples**: Lists, List Functions and Methods, List Operations, Tuples **Dictionaries**: Creating a Dictionary, Operators in Dictionary, Dictionary Methods, Using for Loop with Dictionaries, Operations on Dictionaries, Ordered Dictionaries **Files in Python**: Files, Opening and Closing, Working with Text Files, Working with Binary Files, The 'with' statement, Pickle in Python, The seek() and tell() Methods, Random Accessing of Binary Files, Zipping and Unzipping Files, Working with Directories, Running Other Programs from Python Program **Regular Expressions**: What is a Regular Expression?, Sequence Characters in Regular Expressions, Quantifiers in Regular Expressions, Special Characters in Regular Expressions, Using Regular Expression on Files, Retrieving Information from an HTML File	10
IV	**OOPs in Python**: Problems in Procedure Oriented Approach, Specialty of Python, Features of Object Oriented Programming System (OOPS), Constructors and Destructors **Classes and Objects**: Creating a Class, The Self Variable, Types of Variables, Namespaces, Types of Methods, Passing Members of One Class to Another Class, Inner Classes **Inheritance and Polymorphism**: Inheritance in Python, Types of Inheritance, Constructors in Inheritance, Overriding Super Class Constructors and Methods, The super() method, Method Resolution Order (MRO), Polymorphism, Duck Typing in Python, Operator Overloading, Method Overloading, Method Overriding **Abstract Classes and Interfaces**: Abstract Class, Abstract Method, Interfaces in Python, Abstract Classes vs. Interfaces	10
V	**Date and Time in Python:** Date and Time, Date and Time Now, Combining Date and Time, Formatting Dates and Times, Finding Durations using "timedelta", Comparing Two Dates, Sorting Dates, Stopping Execution Temporarily, Knowing the Time taken by a Program, Working with Calendar Module **Exceptions In Python**: Errors in a Python Program, Exceptions, Exception Handling, Types of Exceptions, The Except Block, The Assert Statement, User-Defined Exceptions, Logging the Exceptions **Graphical User Interface**: Creating a GUI in Python, Widget classes, Working with fonts and colours, Working with Frames, Layout Manager, Event Handling **Python Packages for Blockchain**	10

Books and References:					
Sr. No.	**Title**	**Author/s**	**Publisher**	**Edition**	**Year**
1.	Programming through Python	M. T. Savaliya, R.K Maurya, G.M Magar	Staredu Solutions	1st	2018

2.	Let Us Python	Y. Kanetkar,	BPB	1st	2019
3.	Programming in Python 3	Mark Summerfield	Pearson Education	2nd	2018
4.	Learning Python	Lutz M	O'Reilly-Shroff	5th	2013
5.	Beginning Python	Magnus Lie Hetland	Apress	2nd	2009
6.	Star Python	Star Certification	Star Certification	1st	2018

Course Outcome:
- Proficiency in using and applying various data types including, string, array list, tuple and dictionary.
- Ability to develop modular programs using object oriented paradigm
- Ability to develop GUI bases applications and perform File operations
- Learning about handling exceptions and use of date and time in Python
- Knowledge about use of various blockchain tools

PGDBCT102: Fundamentals of Web Programming

P. G. Diploma in Block Chain Technology (PGDBCT)		Semester – I	
Course Name: Fundamentals of Web Programming		**Course Code: PGDBCT203**	
Periods per week (1 Period is 60 minutes)		4	
Credits		2	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2	40
	Internal	--	60

Course Objectives:
- Introducing the basic concepts of Internet and web design to learners.
- Providing brief knowledge about HTML5 concepts.
- Giving insight of the Page layout and navigation with HTML5.
- Making students aware about use of Tables, Forms and Media with HTML5.
- Provide the knowledge of web page design using CSS.
- Data validation using Java Script.
- Building applications with angular.

Unit	Details	Lectures
I	**HTML5:** Introduction, Why HTML5? Formatting text by using tags, using lists and backgrounds, Creating hyperlinks and anchors. **HTML5 Page layout and navigation:** Creating navigational aids: planning site organization, creating text based navigation bar, creating graphics based navigation bar, creating graphical navigation bar, creating image map, redirecting to another URL, creating division based layouts: HTML5 semantic tags, creating divisions, creating HTML5 semantic layout, positioning and formatting divisions.	10

II	**HTML5 Tables, Forms and Media:** Creating tables: creating simple table, specifying the size of the table, specifying the width of the column, merging table cells, using tables for page layout, formatting tables: applying table borders, applying background and foreground fills, changing cell padding, spacing and alignment, creating user forms: creating basic form, using check boxes and option buttons, creating lists, additional input types in HTML5, Incorporating sound and video: audio and video in HTML5, HTML multimedia basics, embedding video clips, incorporating audio on web page.	**10**
III	**Introduction to Style Sheets** : Understanding Styles, Constructing Style Rules, Creating Styles for Nested Tags, Creating Classes and IDs for Applying Styles, Applying Styles to Hyperlinks, Creating and Linking to External Style Sheets **Formatting Text by Using Style Sheets:** Specifying a Font Family, Specifying a Font Size and Color, Applying Bold and Italics, Applying Strikethrough and Underlining, Creating Inline Spans , Adjusting Spacing Between Letters **Formatting Paragraphs by Using Style Sheets:** Indenting Paragraphs, Applying a Border to a Paragraph, Specifying a Border Style, Setting Border Padding, Specifying Border Width and Color, Formatting Border Sides Individually, Setting All Border Attributes at Once, Specifying the Horizontal Alignment of a Paragraph, Specifying Vertical Space within a Paragraph **Displaying Graphics:** Selecting a Graphics Format, Preparing Graphics for Web Use, Inserting Graphics, Arranging Elements on the Page, Controlling Image Size and Padding, Hyperlinking from Graphics, Using Thumbnail Graphics, Including Alternate Text for Graphics, Adding Figure Captions	**10**
IV	**Java Script:** Introduction, Client-Side JavaScript, Server-Side JavaScript, JavaScript Objects, JavaScript Security **Operators:** Assignment Operators, Comparison Operators, Arithmetic Operators, % (Modulus), ++(Increment), --(Decrement), -(Unary Negation), Logical Operators, Short-Circuit Evaluation, String Operators, Special Operators, ?: (Conditional operator), , (Comma operator), delete, new, this, void **Statements:** Break, comment, continue, delete, do...while, export, for, for...in, function, if...else, import, labelled, return, switch, var, while, with **Core JavaScript (Properties and Methods of Each)** : Array, Boolean, Date, Function, Math, Number, Object, String, regExp **Document and its associated objects:** document, Link, Area, Anchor, Image, Applet, Layer **Events and Event Handlers :** General Information about Events, Defining Event Handlers, event, onAbort, onBlur, onChange, onClick, onDblClick, onDragDrop, onError, onFocus, onKeyDown, onKeyPress, onKeyUp, onLoad, onMouseDown, onMouseMove, onMouseOut, onMouseOver, onMouseUp, onMove, onReset, onResize, onSelect, onSubmit, onUnload	**10**
V	**Angular:** Introduction, Environment and Project setup, components, modules, data binding, event binding, templates, directives, pipes, routing, services, Http Client, CLI prompts, Forms, Materials/CDK virtual scrolling, drag and drop, animations, materials, testing and building projects.	**10**

Books and References:					
Sr. No.	Title	Author/s	Publisher	Edition	Year
7.	HTML5 Step by Step	Faithe Wempen	Microsoft Press		2011

8.	Web Design The Complete Reference	Thomas Powell	TMH		2009
9.	Head First HTML 5 programming	Eric Freeman	O'Reilly		2013
10.	JavaScript 2.0: The Complete Reference	Thomas Powell and Fritz Schneider	TMH	2nd	2004
11.	ng-book: The Complete Guide to Angular	Nate Murray, Felipe Coury, Ari Lerner, and Carlos Taborda	Fullstack.io		2020

Course Outcomes:

After completion of the course, a student should be able to:

- Understand the meaning of the basic terminologies of web technology and explore, use the HTML5 concepts. Understand the basic requirement of web design.
- Develop web pages using the Page layout, Navigation, Tables, Forms and Media features of HTML5.
- Add Cascading Style sheet for beautifying the web pages.
- Use the Java Script for validation of user forms in web pages.
- Develop application using angular.

PGDBCT103: Linux Operating System

P. G. Diploma in Block Chain Technology (PGDBCT)		Semester – I	
Course Name: Linux Operating System		**Course Code: PGDBCT103**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2	40
	Internal	--	60

Course Objectives:

- Describe the relationship between GNU and Linux.
- Describe the relationship between Linux and Unix.
- Discuss features which make Linux a viable and popular operating system.
- Describe various operating system concepts such as multitasking, virtual memory
- Describe and apply various command line utilities
- Describe and apply various file related commands

Unit	Details	Lectures
I	Linux Basics: History of Linux: (History, FOSS, current Linux Distributions-Distros examples), Linux Operating System Layers, The	**10**

	Linux Shell (different kinds of shell), Process: (parent and child processes), Files and Directories (File Structure and directory structure), Interaction with System. Linux Installation	
II	Shells and Utilities: Getting Started With Shell Programming: The bash shell, Shell commands, The role of shells in the Linux environment, Other standard shells, Write a simple shell script - "Hello World!" (Starting a script with Shebang line (#!) ,Comments in a script ,Setting up permissions on a script, Execute a script, Debug a script), Variables in shell : (Assign values to shell variables, Default shell variables value , Rules for Naming variable name, Display the value of shell variables, Quoting, The export statement, Unset shell and environment variables, Getting User Input Via Keyboard), Bash variable existence check, Customize the bash shell environments: Recalling command history, Path name expansion, Create and use aliases, The tilde expansion, Startup scripts-(Using aliases, Changing bash prompt, Setting shell options , Setting system wide shell options), Commonly Used Commands and Utilities (ls,rm,cat etc – at least 25 commands/utilities for example)	10
III	Basic Administration: Basic System Administration (Run levels, User accounts), Kernel Administration: (Linux kernel sources, rebuilding kernel, installing kernel), Managing Users, Managing File Systems, Linux File Permissions, Devices and Modules (device drivers)	10
IV	Files Systems and Editing Files: File Systems, Linux Files, Directories and Archives, The vi editor, awk, sed. The X Window System: Desktop (Desktop environments -GNOME, KDE, XFCE) The X Window System ,Xorg, Window manager, Display Managers, Widget Libraries or toolkits (Athena Widgets, Motif toolkit, Gtk, Qt, LessTif)	10
V	Linux Software: Software Management, Office and Database Applications, Graphics Tools and Multimedia, Mail and News Clients, Web, FTP, and Java Clients, Security: Encryption, Integrity Checks, and Signatures, Security-Enhanced Linux, Secure Shell and Kerberos, Firewalls.	10

Books and References:					
Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Linux: The Complete Reference	Richard Peterson	McGawHill	VI	
2.	Linux for Beginners: An Introduction to the Linux Operating System and Command Line	Jason Canon	Createspace Independent Pub	I	2014
3.	Linux with Operating System Concepts	Richard Fox	CRC Press		2015

Course Outcomes:

After completion of the course, a student should be able to:

1. Identify and use UNIX/Linux utilities to create and manage simple file processing operations
2. Students will be able to create processes background and fore ground
3. Students will be create shared memory segements,pipes ,message queues and can exercise interprocess communication
4. Able to organize directory structures with appropriate security, and develop shell scripts to perform more complex tasks.

PGDBCT104: Data Structures and Algorithms

P. G. Diploma in Block Chain Technology (PGDBCT)	Semester – I	
Course Name: Data Structures and Algorithms	**Course Code: PGDBCT104**	
Periods per week (1 Period is 60 minutes)	4	
Credits	4	
	Hours	**Marks**
Evaluation System	**Theory Examination**	2	40
	Internal	--	60

Course Objectives:

- To describe the basic concepts of data structures and algorithms
- To make understand concepts about searching and sorting techniques
- To impart basic concepts about stacks,queues,lists,trees and graphs
- To make understand about writing algorithms and step by step approach in solving problems with the help of fundamental data structures

Unit	Details	Lectures
I	**Algorithm Analysis:** Experimental Studies, functions used in analysis, Asymptotic Analysis, Justification Techniques. **Recursion:** Examples, Analyzing Recursive Algorithms, Linear, binary and multiple recursion, Designing Recursive Algorithms, Eliminating Tail Recursion	**10**
II	**Array-Based Sequences:** Low-Level Arrays, Dynamic Arrays and Amortization, Using Array-Based Sequences, Multidimensional Data Sets. **Stacks, Queues, and Deques:** Stacks, Queues, Double-Ended Queues **Linked Lists:** Singly Linked Lists, Circularly Linked Lists, Doubly Linked Lists, The Positional List ADT, Sorting a Positional List, Maintaining Access Frequencies, Link-Based vs. Array-Based Sequences	**10**
III	**Trees:** General Trees, Binary Trees, Implementing Trees, Tree Traversal Algorithms, An Expression Tree **Priority Queues:** The Priority Queue Abstract Data Type, Implementing a	**10**

	Priority Queue, Heaps, Sorting with a Priority Queue, Adaptable Priority Queues **Maps, Hash Tables, and Skip Lists:** Maps and Dictionaries, Hash Tables, Sorted Maps, Skip Lists, Sets, Multisets, and Multimaps,		
IV	**Search Trees:** Binary Search Trees, Balanced Search Trees, AVL Trees, Splay Trees, (2,4) Trees, Red-Black Trees. **Sorting and Selection:** Merge-Sort, Quick-Sort, g Sorting through an Algorithmic Lens, Comparing Sorting Algorithms, Selection		10
V	**Text Processing:** Abundance of Digitized Text, Pattern-Matching Algorithms, Dynamic Programming, Text Compression and the Greedy Method, Tries **Graph Algorithms:** Graphs, Data Structures for Graphs, Graph Traversals, Transitive Closure, Directed Acyclic Graphs, Shortest Paths, Minimum Spanning Trees		10

Books and References:					
Sr. No.	**Title**	**Author/s**	**Publisher**	**Edition**	**Year**
1.	Data Structures and Algorithms in Python	Michael T. Goodrich, Roberto Tamassia. Michael H. Goldwasser	Wiley		2013
2.	Teach yourself Data Structures and Algorithms in 24 Hours	Robert Lafore	Sams		1999
3.	Data Structures and Algorithms	Alfred V Aho and John E Hopcroft and Jeffrey D Ullman,	Pearson Education		2002
4.	Data Structures And Algorithmic Thinking With Python	Narasimha Karumanchi	CareetMonk Publications		2016
5.	Learning Functional Data Structures and Algorithms	Atul S. Khot Raju Kumar Mishra	Packt Publishing		2017
6.	Data Structures And Algorithms Made Easy	Narasimha Karumanchi	CareetMonk Publications		2017

Course Outcomes:
1. After completion of the course, a student should be able to:
2. Analyze algorithms and algorithm correctness.
3. Summarize searching and sorting techniques
4. Describe stack,queue and linked list operation.
5. Have knowledge of tree and graphs concepts.

PGDBCT105: Software Engineering

P. G. Diploma in Block Chain Technology (PGDBCT)		Semester – I	
Course Name: Software Engineering		Course Code: PGDBCT105	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	Marks
Evaluation System	Theory Examination	2	40
	Internal	--	60

Course Objectives:
- to understand the ideas that drive effective agile teams, and the values and principles that bring them together.
- to understand the most popular agile schools of thought—Scrum, XP, Lean, and Kanban—and how they can all be agile, even though they're very different from each other.
- to teach specific agile practices that can be applied to projects today
- to give you the framework of values and principles that are needed to implement them effectively
- to help to understand own team and company better, so that an agile approach can be chosen that matches the mindset
- to learn a new way of thinking that will help to become a more effective agile team

Unit	Details	Lectures
I	**Agile and its values:** Introduction, Team lead, Silver bullet, how agile helps, Fractured perspective and its problems, Agile Manifesto, understanding agile, where to start a new methodology. **Agile Principles:** 12 principles of agile software, customer is always right, delivering a project, communicating and working together, project execution, constantly improving project and team, bringing all principles together	12
II	**Scrum and Self-Organizing Teams:** Rules of scrum, Everyone on scrum team owns a project, whole team uses daily scrum, scripts, planning and retrospection. **Scrum planning and Collective environment:** not expecting the unexpected, victory lap.	12
III	**XP and embracing change:** XP primary practices, The XP Values Help the Team Change Their Mindset, Shift of momentum, Understanding XP principles. **XP, Simplicity and Incremental Design:** Code and Design, Make Code and Design Decisions at the Last Responsible Moment, Incremental Design and the Holistic XP Practices, Final Score.	12
IV	**Lean, Eliminating Waste, and Seeing the Whole:** Lean thinking, creating heroes and magical thinking, eliminate waste, gain deeper understanding of the product, deliver as fast as possible. **Kanban, Flow, and Constantly Improving:** Principles of Kanban, improving	12

	process with Kanban, measure and manage flow, emergent behaviour with Kanban. **The Agile Coach:** Coaching and its principles.	
V	**Promote Agile Budgeting:** Moving away from agile budgeting, why agile budgeting? value-driven supply and demand, structuring around high-value ideas, Components of an Agile Budgeting Framework, people involved with agile budgeting, lightning bolt shaped teams, tailoring the framework, cadence for curating ideas, investing. **Applying Agile Success Measures:** outcomes matter, value of metrics, value of leading indicators, measures for running enterprise, end-to-end lead time, enterprise dashboard for correlation, measures of success. **Reinventing HR for agile:** HR as promoters of agile, Supporting the Shift toward Agile Roles, Hiring for Agile-Minded Employees, Adapting toward Excellence	**12**

Books and References:					
Sr. No.	**Title**	**Author/s**	**Publisher**	**Edition**	**Year**
12.	Learning Agile	Andrew Stellman and Jennifer Greene	O'Reilly		2014
13.	Building and Running Agile Organizations	Mario E. Moreira	Apress		2017
14.	Head First Agile	Andrew Stellman and Jennifer Greene	O'Reilly		2017

Course Outcomes:

After completion of the course, a student should be able to:

- Understand and think the agile way
- Understand the SCRUM and adopt scrum practices and mechanics.
- Change the mindset and apply the XP practices.
- Start lean thinking and eliminate waste.
- Apply the agile methodology to budgeting, HR and agile success measures.

PGDBCT106: Introduction to Blockchain

P. G. Diploma in Block Chain Technology (PGDBCT)	Semester – I	
Course Name: Introduction to Blockchain	Course Code: PGDBCT106	
Periods per week (1 Period is 60 minutes)	4	
Credits	4	
	Hours	**Marks**
Evaluation System	Theory Examination	2	40
	Internal	--	60

Course Objectives:
- This course aims to provide basic concepts of block chain
- It covers the what is block chain and what are its uses
- To know when and why we need to use block chain technology.
- To make students understand what is block chain who have no prior knowledge

Unit	Details	Lectures
I	**Blockchain:** Introduction, growth, distributed systems, history of blockchain and bitcoin, types of blockchain, consensus CAP theorem and blockchain. **Decentralization:** Decentralization using blockchain, methods of decentralization, blockchain and full ecosystem decentralization, smart contracts, decentralized organisations, platforms for decentralization.	12
II	**Symmetric Cryptography:** Working with openSSL command line, Introduction, Mathematics, Cryptography, Confidentiality, Integrity, Authentication, Non-repudiation, Accountability, Cryptographic primitives, Symmetric cryptography, data encryption standard, advanced encryption standard. **Public Key Cryptography:** Asymmetric cryptography, Public and private keys, RSA, Discrete logarithm problem in ECC, Hash functions, RSA digital signature algorithm, Elliptic Curve Digital Signature Algorithm, Financial markets and trading	12
III	**Bitcoin:** Introduction, definition, digital keys and addresses, transactions, blockchain, mining, **Bitcoin network and payments:** Bitcoin network, Wallets, payments, innovation **Bitcoin Clients and APIs:** Bitcoin installation, Types of bitcoins core clients, setting up bitcoin node, setting up source code, setting up bitcoin.conf, setting up a node testnet, setting up a node regtest, experiment with cli, bitcoin programming and cli.	12
IV	**Alternative coins:** Theoretical foundations, bitcoin limitations, Namecoin, Litecoin, Primecoin, Zcash.	12
V	**Smart contracts:** History, definition, Ricardian contracts. **Alternative Blockchains:** Blockchains, platforms and frameworks. **Blockchain outside the currencies:** Internet of things, IoT blockchain experiment, government, health, finance, media.	12

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
15.	Mastering Blockchain	Imran Bashir	Packt	Second	2018
16.	Architecture for Blockchain Applications	Xiwei Xu, Ingo Weber, Mark Staples	Springer		2019

Course Outcomes:

After completion of the course, a student should be able to:

- Explain the blockchain evolution and decentralization using blockchain.
- Secure applications suing symmetric and public key cryptography.
- Understand bitcoins in detail.
- Explain different types of coins.
- Apply blockchain beyond crypto currencies to other applications.

SEMESTER II

PGDBCT201: Blockchain Development in Ethereum and Solidity

P. G. Diploma in Block Chain Technology (PGDBCT)		Semester – II	
Course Name: Blockchain Development in Ethereum and Solidity		Course Code: PGDBCT201	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	Marks
Evaluation System	Theory Examination	2	40
	Internal	--	60

Course Objectives:

- See how Ethereum (and other cryptocurrencies) work
- Compare distributed apps (dapps) to web apps
- Rrite Ethereum smart contracts in Solidity language
- Connect Ethereum smart contracts to your HTML/CSS/JavaScript web applications
- Deploy your own dapp, coin, and blockchain
- Work with basic and intermediate smart contracts

Unit	Details	Lectures
I	**Bridging the Blockchain Knowledge Gap:** Blockchain, What Ethereum does? Three parts of blockchain, Ether as currency and commodity, Protocol Power, What smarts contracts do? Where is data? Inside EVM, What is Ethereum good for? State of smart contract, Building public and private chains. **The Mist Browser:** Wallets, The bank teller metaphor, Bank history, Encryption and trust, System requirements, using parity with geth, into the mist, blockchain, anonymity in cryptocurrency. **The EVM:** Central Bank network, Virtual machines, What EVM does? EVM Applications are called smart contracts, State machines, How the Guts of the EVM Work, Blocks: The History of State Changes, Mining's Place in the State Transition Function, Renting Time on the EVM, Gas, Working with Gas, Estimating Gas Fees for Operations, Opcodes in the EVM.	**12**
II	**Solidity Programming:** Introduction, Global Banking made real, Complementary Currency, Learning to Program the EVM, Design Rationale, The Importance of Formal Proofs, Automated Proofs, Testing, Ethereum Virtual Machine, Solidity and Solidity files, Structure of a contract, Data types in Solidity, Storage and memory data locations, Literals, Integers, Boolean, The byte data type, Arrays, Structure of an array, Enumerations, Address, Mappings. **Global Variables and Functions:** The var type variables, Variables hoisting, Variable scoping, Type conversion, Block and transaction global variables, Cryptography global variables, Address global variables, Contract global variables. **Expressions and Control Structures:** Solidity expressions, The if decision control, The while loop, The for loop, The do...while loop, The break statement, The continue statement, The return statement. **Writing Smart Contracts:** smart contracts, Writing a simple contract, Creating contracts, Constructors, Contract composition, Inheritance, Encapsulation, Polymorphism, Method overriding, Abstract contracts,	**12**

	Interfaces.	
III	**Smart Contracts and Tokens:** EVM as Back End, Assets Backed by Anything, Cryptocurrency Is a Measure of Time, The Function of Collectibles in Human Systems, Platforms for High-Value Digital Collectibles, Tokens Are a Category of Smart Contract, Creating a Token on the Testnet, Deploying Contract, Playing with Contracts. **Functions, Modifiers, and Fallbacks:** Function input and output, Modifiers, The view, constant, and pure functions, The address functions, The fallback function. **Exceptions, Events, and Logging:** Error handling, Events and logging. Truffle Basics and Unit Testing: Application development life cycle management, Truffle, Development with Truffle, Testing with Truffle. **Debugging Contracts.**	12
IV	**Mining Ether:** Introduction, Ether's source, Mining, Versions of the Truth, Dag and Nonce, Faster blocks, Stale blocks, difficulty, Evaluating the Ancestry of Blocks and Transactions, How Ethereum and Bitcoin Use Trees, Forking, Executing Commands in the EVM via the Geth Console, Launching Geth with Flags, Starting the miner, Mining on testnet, GPU mining rigs, Mining on a Pool with Multiple GPUs. **Cryptoeconomics Survey:** Introduction, Use, Speed of blocks, Ether insurance scheme, common attack scenarios. **Dapp Deployment:** Seven Ways to Think About Smart Contracts, Dapp Contract Data Models, EVM Back End and JS Front End, Web 3, JavaScript API, Using Meteor with the EVM, Executing Contracts in the Console, Prototyping, Third-Party Deployment Libraries.	12
V	**Creating Private Chains:** Private and Permissioned Chains, Setting Up a Local Private Chain, Optional Flags to Use with New Chains, Private Blockchains in Production Usage. **Use Cases:** Chains Everywhere, The Internet of Ethereum Things, Retail and E-Commerce, Community and Government Financing, Human and Organizational Behavior, Financial and Insurance Applications, Inventory and Accounting Systems, Software Development, Gaming, Gambling, and Investing. **Advanced Concepts:** Leading Software Developers Toward Decentralization, Ethereum Release Schedule, What the Future Holds, Innovations, Ethereum Roadmap.	12

Books and References:					
Sr. No.	Title	Author/s	Publisher	Edition	Year
17.	Introducing Ethereum and Solidity	Chris Dannen	Aperss		2017
18.	Solidity Programming Essentials	Ritesh Modi	Packt		2018

Course Outcomes:

After completion of the course, a student should be able to:

- use Solidity and the Ethereum project
- use skills in smart contract patterns and distributed application development
- deploy own smart contracts and learn how they can serve as a back-end for JavaScript and HTML applications on the Web
- Extend JavaScript development skills to blockchain environment

PGDBCT202: Smart Contracts with Ethereum

P. G. Diploma in Block Chain Technology (PGDBCT)	Semester – II	
Course Name: Smart Contracts with Ethereum	Course Code: PGDBCT202	
Periods per week (1 Period is 60 minutes)	4	
Credits	4	
	Hours	Marks
Evaluation System	Theory Examination	2	40
	Internal	--	60

Course Objectives:

- to build powerful, robust, and optimized smart contracts using solidity from scratch and in combination with other open source JavaScript libraries
- to build own extensive, decentralized applications that can smartly execute on a blockchain
- to give the insight of the blockchain as a service and the dark web market

Unit	Details	Lectures
I	**Building Smart Contracts:** A smart contract in seven lines of code, Remix, Increment and decrement operations using Solidity, Coding a loop, Raising an issue on GitHub, Smart contract on a private blockchain, Writing the genesis block, Building a private blockchain, Connecting MIST browser using geth, Mining ethers in a private blockchain, Deploying smart contracts on private chain.	**12**
II	**A Noob's Guide to DApps and DAO:** Understanding DApps, Steps to develop a DApp, Architecture of a DApp, What is ethercast? btcrelay.org, oraclize.it, the-pitts-circus.com, Understanding the design of DAO, The rise and fall of DAO. **Smart Contracts in Detail:** What makes a contract "smart"? Definition and design, Role of code in a smart contract, Basic anatomy of a smart contract design, Smart contract optimization, Smart contract auditing and compliance, Designing a voting DApp	**12**
III	**Web3.js:** Introduction, Web3.js in the Ethereum, Ecosystem, API structure of Web3.js, Designing an ownership contract. **Developing a Cryptocurrency:** Token versus coin, ERC20 token development using Truffle, Arbitrage trading for cryptocurrencies, The ICO story, Fiat2Crypto and Crypto2Crypto exchange, Parity hack demystified, Parity hack returns.	**12**
IV	**Enterprise Use Cases:** Banking and payments, Insurance, Supply chain management, Forecasting and prediction market, Charity, Public Benefits, Energy management, Art and Music, Retail, Real estate, Cyber Security, crowdfunding, Networking and IoT, Voting, Government, Private transport and ride sharing, cloud storage, healthcare, **Smart Contract Use Cases:** Insurance, Trade finance, Derivatives, Securities, Accounts, Digital identity, Record-keeping, Loans and mortgages, Legal, Supply chain, Clinical trials, Terminal disease research, Decentralized microblogging, Administrative and security constraints, TwtAccount.sol, TwtRegistry.sol, Service setup on the private blockchain, Reading tweets	**12**

	BaaS and the Dark Web Market: Privacy, types of blockchain, private blockchains, public blockchains, consortium blockchains, Blockchain as a service, Enterprise platform for BaaS, IBM Hyperledger, Microsoft Azure EBaaS, Amazon Eris, Dark web marketplace, Project smartCV.	
V	**Advanced Topics and the Road Ahead:** Common design patterns, Restricting access, Token systems, Factory pattern, Registries, Voting systems, DACs and DAS, Ethereum improvement proposal, Rational behind EIPs, Types of EIP, EIP life cycle, EIP template, Consortium blockchains, Case study on R3 Corda, Tangle beyond blockchain, Shortcomings of a blockchain, Tangle demystified, Iota GitHub analysis Purchase and storage of Iota.	**12**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
19.	Ethereum Smart Contract Development	Mayukh Mukhopadhyay	Packt Publishing	--	2018

Course Outcomes:

After completion of the course, a student should be able to:

- Build the smart contracts efficiently
- Build Dapps and deploy them on blockchain
- Develop Cryptocurrency
- Identify the applications of blockchain in Industry
- Understand the blockchain as a service and the dark web market

PGDBCT203: Blockchain with Hyperledger

P. G. Diploma in Block Chain Technology (PGDBCT)		**Semester – II**	
Course Name: Blockchain with Hyperledger		**Course Code: PGDBCT203**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2	40
	Internal	--	60

Course Objectives:

- To lay a solid foundation for understanding the state of the technology landscape—including active and incubating projects under development at Hyperledger.
- To provide with a framework for choosing the right technology platform, designing your solution, and integration with existing systems.
- To explain the various governance models for establishing and operating a blockchain business network.

Unit	Details	Lectures
I	**Blockchain - Enterprise and Industry Perspective:** terms, Four core building blocks of blockchain frameworks, Fundamentals of the secure transaction processing protocol, Blockchain in the enterprise, Enterprise design principles, Technology considerations for choosing a blockchain framework, Enterprise integration and designing for extensibility. **Exploring Hyperledger Fabric:** Building on the foundations of open computing, Hyperledger frameworks, tools, and building blocks, Hyperledger Fabric component design, Hyperledger Fabric, Understanding governance in business networks powered by blockchain.	12
II	**Setting the Stage with a Business Scenario:** Trading and letter of credit, Business scenario and use case, Setting up the development Environment, Network components' configuration Files, Launching a sample trade network. **Designing a Data and Transaction Model with Golang:** Starting the chaincode development, Creating a chaincode, Access control, Implementing chaincode functions, Testing chaincode, Chaincode design, Logging output.	12
III	**Exposing Network Assets and Transactions:** Building a complete application, Integration with existing systems and processes. **Business Networks:** Introduction, Defining business networks, Introducing participants, Introducing assets, Introducing transactions, Events, Implementing a business network, Example, The letter of credit sample, Analyzing the letter of credit process, A description of the business network, A model of the business network, Examining the live network, Creating business network APIs	12
IV	**Agility in a Blockchain Network:** Defining the promotion process, Configuring a continuous integration Pipeline, Configuring Git repository, Testing the end-to-end process, Updating the network. **Life in a Blockchain Network:** Modifying or upgrading a Hyperledger Fabric application, System monitoring and performance	12
V	**Governance, Necessary Evil of Regulated Industries:** Decentralization and governance, Exploring the business models, Role of governance in a business Network, Business domains and processes, Governance structure, Governance and the IT solution. **Hyperledger Fabric Security:** Hyperledger Fabric design goals impacting security, Hyperledger Fabric architecture, Network bootstrap and governance, Strong identities, Chaincode security, Common threats and how Hyperledger Fabric mitigates them, Hyperledger Fabric and Quantum Computing, General data protection regulation (GDPR) considerations. **The Future of Blockchain and the Challenges Ahead:** Hyperledger framework – business blockchain technology, The road ahead for Blockchain, Staying engaged with the Hyperledger blockchain.	12

Books and References:					
Sr. No.	**Title**	**Author/s**	**Publisher**	**Edition**	**Year**
20.	Hands-On Blockchain with Hyperledger - Building	Nitin Gaur Luc Desrosiers	Packt		2018

	decentralized applications with Hyperledger Fabric and Composer	Venkatraman Ramakrishna Petr Novotny Dr. Salman A. Baset Anthony O'Dowd			

Course Outcomes:

After completion of the course, a student should be able to:

- Overcome the hype related to the cryptocurrency aspects of public, permission-less blockchain—ICOs as a substitute for more traditional IPOs.
- Gain the potential for disrupting traditional systems of banking, insurance, securities, and so on.
- Use blockchain might to company's advantage over the rest of a given domain
- Explain that for blockchain to be successful in an enterprise, it demands a degree of industry collaboration not seen before.
- Understand various governance models for establishing and operating a blockchain business network.

PGDBCT204: Building Projects with Blockchain

P. G. Diploma in Block Chain Technology (PGDBCT)		Semester – I	
Course Name: Building Projects with Blockchain		**Course Code: PGDBCT105**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2	40
	Internal	--	60

Course Objectives:
- To build projects based on blockchain making the understanding of concept better.

Unit	Details	Lectures
I	**Building a wallet service:** Difference between offline and online wallets, hooked-web3-provider and ethereumjs-tx libraries, hierarchical deterministic wallet, key derivation functions, Lightwallet, building wallet service. **Building a Smart Contract Deployment Platform:** Calculating a transaction's nonce, Itroduction to soljs, building a contract deployment platform.	12

II	**Building a Betting App:** Introduction to oraclize, working with strings, building the betting contract, building a client for betting contract. **Building Enterprise Level Contracts:** ethereumja-testrpc, event topics, truffle contract, truffle **Building a Consortium Blockchain:** consortium blockchain, proof-of-authority consensus, parity	12
III	**Crypto-economics and Game Theory:** Securing the Blockchain, Forming Consensus, Transaction Fees, Incentives, Attack Vectors **Ponzis and Pyramids:** Schemes: Ponzi vs. Pyramid, Verifiably Corrupt, Simple Ponzi, Realistic Ponzi, Simple Pyramid, Governmental	12
IV	**Lotteries:** Random-Number Generation, Simple Lottery, Recurring Lottery, Constants and Variables, Gameplay, Cleanup and Deployment, RNG Lottery, Powerball	12
V	**Prize Puzzles:** Obscuring Answers, Simple Puzzle, Commit-Reveal Puzzle, Additional Prize Challenges. **Prediction Markets:** Contract Overview, Tracking State with Events, Trading Shares, Resolving Markets **Gambling:** Gameplay Limitations, Satoshi Dice, Roulette	12

Books and References:					
Sr. No.	**Title**	**Author/s**	**Publisher**	**Edition**	**Year**
21.	Building Blockchain Projects	Narayan Prusty	Packt		2017
22.	Building Games with Ethereum Smart Contracts	Kedar Iyer Chris Dannen	Apress		2018

Course Outcomes:

After completion of the course, a student should be able to:

- Build a wallet service and smart contract deployment contract.
- Build betting app, enterprise level contracts and consortium blockchain.
- Build games, ponzis and pyramids
- Build lotteries games
- Build prize puzzles and prediction market games and understand gambling.

PGDBCT205: Building Dapps with Ethereum

P. G. Diploma in Block Chain Technology (PGDBCT)		**Semester – I**	
Course Name: Building Dapps with Ethereum		**Course Code: PGDBCT205**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2	40
	Internal	--	60

Course Objectives:
- to help transition to this new paradigm of Dapp as easily as possible
- to develop Ethereum application
- to provide a solid understanding of the main components of the Ethereum platform

Unit	Details	Lectures
I	**Writing complex smart contracts:** Simple Crowdsale a crowdsale contract, extending functionality with inheritance **Generalizing functionality with abstract contracts and interfaces:** Making a contract abstract, Allowing multiple contract implementations with inheritance, Real-world crowdsale contracts, Solidity's object oriented features, Libraries, Making simple copin ERC20 complaint.	12
II	**Managing smart contracts with Web3.js:** Geth's interactive console, interacting with simplecoin through Geth;s interactive console. Simplyfying command based deployment with node.js. making development more efficient by deploying on mock networks, smoother interaction with simplecoin through a web UI.	12
III	**Unit testing contracts with Mocha:** Installing Mocha, Setting up SimpleCoin in Mocha, Writing unit tests for SimpleCoin. **Improving the development cycle with Truffle:** Setting up truffle, Moving SimpleCoin under truffle.	12
IV	**Building a complete voting Dapp: D**efining the requirements of a voting dapp, the development plan, starting the truffle project, implementing the voting contract, compiling and deploying simplevoting, writing unit tests, creating a web UI, Improvements. **Making a Dapp production ready:** Event logging, Designing an upgradable library, Designing an upgradable contract.	12
V	**Security Considerations:** General security weak spots, Risks associated with external calls, performing external calls safely, avoiding known security attacks, general security guidelines. **Evolution:** Evolution of Ethereum, Alternative Ethereum implementations, Beyond the Ethereum Blockchain.	12

Books and References:					
Sr. No.	**Title**	**Author/s**	**Publisher**	**Edition**	**Year**
23.	Building Ethereum Dapps: Decentralized applications on the Ethereum blockchain	Roberto Infante	Mannng Publications		2019

Course Outcomes:

After completion of the course, a student should be able to:

- design, implement, and deploy a complete Ethereum Dapp

Evaluation Scheme

- **Both Internal and External Examination will be conducted by the department**

- **The result declaration, marksheet and the Diploma will be awarded by the department**

Internal Evaluation (60 Marks)

The internal assessment marks shall be awarded as follows:
1. Unitwise Quiz (10 Marks each unit): 10 marks Average
2. Problem Solving or Assignments(Practical based):20 Marks
3. Personation of topics assigned related to subject: 20 Marks

External Examination: (40 marks) : Online MCQ as per the following format

	All questions are compulsory	
Q1	(Based on Unit 1) 8 sub questions	8
Q2	(Based on Unit 2) 8 sub questions	8
Q3	(Based on Unit 3) 8 sub questions	8
Q4	(Based on Unit 4) 8 sub questions	8
Q5	(Based on Unit 5) 8 sub questions	8

Practical Evaluation (50 marks)

A Certified copy of hard-bound journal is essential to appear for the practical examination.

1.	Practical Question 1	20
2.	Practical Question 2	20
3.	Journal	5
4.	Viva Voce	5

OR

1.	Practical Question	40
2.	Journal	5
3.	Viva Voce	5

Project Documentation and Viva Voce Evaluation

The documentation should be checked for plagiarism and as per UGC guidelines, should be less than 10%.

1.	Documentation Report (1 to 4)	20
2.	Innovation in the topic	10
3.	Documentation/Topic presentation and viva voce	20

Project Implementation and Viva Voce Evaluation

1.	Documentation Report (5 to last)	20
2.	Implementation	10
3.	Relevance of the topic	10
4.	Viva Voce	10

Appendix – 1

Project Documentation and Viva-voce (Semester II)

Goals of the course Project Documentation and Viva-Voce

The student should:
- be able to apply relevant knowledge and abilities, within the main field of study, to a given problem
- within given constraints, even with limited information, independently analyse and discuss complex inquiries/problems and handle larger problems on the advanced level within the main field of study
- reflect on, evaluate and critically review one's own and others' scientific results
- be able to document and present one's own work with strict requirements on structure, format, and language usage
- be able to identify one's need for further knowledge and continuously develop one's own knowledge

To start the project:
- Start thinking early in the programme about suitable projects.

- Read the instructions for the project.
- Attend and listen to other student´s final oral presentations.
- Look at the finished reports.
- Talk to senior master students.
- Attend possible information events (workshops / seminars / conferences etc.) about the related topics.

Application and approval:
- Read all the detailed information about project.
- Finalise finding a place and supervisor.
- Check with the coordinator about subject/project, place and supervisor.
- Write the project proposal and plan along with the supervisor.
- Fill out the application together with the supervisor.
- Hand over the complete application, proposal and plan to the coordinator.
- Get an acknowledgement and approval from the coordinator to start the project.

During the project:
- Search, gather and read information and literature about the theory.
- Document well the practical work and your results.
- Take part in seminars and the running follow-ups/supervision.
- Think early on about disposition and writing of the final report.
- Discuss your thoughts with the supervisor and others.
- Read the SOP and the rest you need again.
- Plan for and do the mid-term reporting to the coordinator/examiner.
- Do a mid-term report also at the work-place (can be a requirement in some work-places).
- Write the first draft of the final report and rewrite it based on feedback from the supervisor and possibly others.
- Plan for the final presentation of the report.

Finishing the project:
- Finish the report and obtain an OK from the supervisor.
- Ask the supervisor to send the certificate and feedback form to the coordinator.
- Attend the pre-final oral presentation arranged by the Coordinator.
- Rewrite the final report again based on feedback from the opponents and possibly others.
- Prepare a title page and a popular science summary for your report.
- Send the completed final report to the coordinator (via plagiarism software)
- Rewrite the report based on possible feedback from the coordinator.
- Appear for the final exam.

Project Proposal/research plan
- The student should spend the first 1-2 weeks writing a 1-2 pages project plan containing:
  - Short background of the project
  - Aims of the project
  - Short description of methods that will be used
  - Estimated time schedule for the project
- The research plan should be handed in to the supervisor and the coordinator.

- Writing the project plan will help you plan your project work and get you started in finding information and understanding of methods needed to perform the project.

Project Documentation

The documentation should contain:
- Introduction - that should contain a technical and social (when possible) motivation of the project topic.
- Description of the problems/topics.
- Status of the research/knowledge in the field and literature review.
- Description of the methodology/approach. (The actual structure of the s here depends on the topic of the documentation.)
- Results - must always contain analyses of results and associated uncertainties.
- Conclusions and proposals for the future work.
- Appendices (when needed).
- Bibliography - references and links.

New ordinances 6827 & 6828 relating to the
Post Graduate Diploma in Block Chain Technology
[PGDBCT].

1.	Necessity for starting the course:	
		Blockchain helps in the verification and traceability of multistep transactions needing verification and traceability. It can provide secure transactions, reduce compliance costs, and speed up data transfer processing. Blockchain technology can help contract management and audit the origin of a product. It also can be used in voting platforms and managing titles and deeds. So there is a need to have skilled manpower to create such platform for secured credential management whether it is finance, education, industry, Government etc.
2.	Whether the UGC has recommended the course:	UGC has allowed to start 13-Month Advance Diploma Course in Blockchain By Jetking
3.	Whether all the courses have commenced from the academic year 2019-2020 (2022-23):	New programme to be started in 2022-2023
4.	The courses started by the University are self-financed, whether adequate number of eligible permanent faculties are available?:	Thisprogramme needs industry experts who are in the field. Full time adhoc teachers and industry experts will be conducting this programme
5.	To give details regarding the duration of the Course and is it possible to compress the course?:	1 year with two semesters
6.	The intake capacity of each course and no. of admissions given in the current academic year:	30 seats after conducting a CET

7.	Opportunities of Employability / Employment available after undertaking these courses:	The demand for people with Blockchain skills is high. Due to its many fields of application, it is looking to hire those who have the skills set to navigate this new technology. Job designations like • Blockchain developer. ... • Blockchain Solution Architect. ... • Blockchain project manager. ... • Blockchain UX designer. ... • Blockchain quality engineer. ... • Blockchain legal consultant. ... • Everyone in the business. are on demand worldwide.

Signature:

Dr. Mrs. R. Srivaramangai
Chairman, Board of Studies
Information Technology