Quantum University, Roorkee
Course Outcomes

Bachelor of Technology in Computer Science & Engineering

Program Name: **Engineering**

Course Name **Engineering Physics**

Course Code **PH3101**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Students should be able to Understand special theory of realtivity (STR), concepts linked with STR and radiation laws.	2	Emp
CO2	Students should be able to Understand interference, diffraction and able to connect it to a few engineering applications.	2	S
CO3	Students should be able to Explain the phenomena of polarization in electromagnetic waves and their production, Detection and analysis. They will also understand the operation and working principle of laser.	2	S
CO4	Students should be able to Understand electromagnetic theory using maxwells equations, and its uses in various engineering application. They will also understand the difference between dia, para and ferromagnetic materials.	2	Emp
CO5	Students should be able to Explain fundamentals of quantum mechanics and apply it to problems on bound states.	1	Emp

Course Name **Fundamentals of Mechanical and Mechatronics Engineering**

Course Code **ME3103**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Ent)/ None (Use , for more than One)
CO1	Students should be able to Understand application of the laws of thermodynamics to wide range of systems and aware about the basics of thermal engineering applications in IC engines and its working.	2	S
CO2	Students should be able toKnow and apply the types of forces and concepts used to analyze force mechanisms	2	Emp
CO3	Students should be able to Analyze and understand the Stress-strain diagrams and use of material.	2	S

Registrar
Quantum University

CO4	Students should be able toUnderstand the various machining processes	2	Emp
CO5	Students should be able to Gain knowledge on the various engineering materials and their properties.	1	Emp

Course Name **Engineering Physics Lab**
Course Code **PH3140**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Ent)/ None (Use , for more than One)
CO1	Students should be able to Understand the process of performing the experiments on wavelength and focal length practically.	2	Emp
CO2	Students should be able to Verify the theoretical calculations with observed results in practical experiments.	2	Emp
CO3	Students should be able to Enhance the skills of using apparatus for verification of different laws.	2	S

Course Name **Mathematics I**
Course Code **MA3102**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Students should be able to Learn the basic principles of multi-variable calculus with their proofs. They should be able to classify partial differential equations and transform them into canonical form. They will also understand how to extract information from partial derivative models in order to interpret reality.	2	Emp
CO2	Students should be able to Understand and learn how to find the area and volume of any region and solid body respectively by integral and also find the moments of inertia for a thin plate in plane.	2	Emp
CO3	Students should be able to Understand theorems related to directional derivative of gradient and reproduce its proof. They should be able to Explain the concept of a vector integration in a plane and in space.	2	S
CO4	Know basic application problems described by second order linear differential equations with constant coefficients. They should be also able to understand and solve the applications associated with Laplace Transform.	2	S

Quantum University Roorkee

Registrar
Quantum University

CO5	Students should be able to Solve the linear equations using matrix properties and Determine characteristic equation, eigen values, eigenvectors and diagonalizable of a matrix.	1	Emp

Course Name **Basics of Computer and C Programming**
Course Code **CS3103**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Students should be able to Approach the programming tasks using techniques learned in Theory and write pseudo-codes based on the requirements of the problem.	2	None
CO2	Students should be able to Use the comparisons and limitations of the various programming constructs and choose the right one for the task in hand.	2	S
CO3	Students should be able to Write the program based on numerical techniques learned and able to edit, compile,debug, correct, recompile and run it.	2	S
CO4	Students should be able to Develops the knowledge of different software on different Operating System Platform such as Linux/Windows (Open Source and Licensed) with understanding of different IDE	2	Emp
CO5	Students should be able to Makes students gain a broad perspective about the uses of computers in engineering industry	1	Emp

Course Name **Basics of Computer and C Programming Lab**
Course Code **CS3140**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Students should be able to Approach the programming tasks using techniques learned in Theory and write pseudo-codes based on the requirements of the problem.	2	Emp
CO2	Students should be able to Use the comparisons and limitations of the various programming constructs and choose the right one for the task in hand.	2	S
CO3	Students should be able to Write the program based on numerical techniques learned and able to edit, compile, debug, correct, recompile and run it.	2	Emp

Course Name **Disaster Preparedness & Management**
Course Code **CE3102**

Registrar
Quantum University

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Understand the basic concepts of disasters and its relationships with development.	2	Em
CO2	Understand the approaches of Disaster Risk Reduction (DRR) and the relationship between vulnerability, disasters, disaster prevention and risk reduction.	2	S
CO3	Understand the Medical and Psycho-Social Response to Disasters.	2	Em
CO4	Prevent and control Public Health consequences of Disasters.	2	Em
CO5	Awareness of Disaster Risk Management institutional processes in India.	2	Em

Course Name **Programming with C for Problem Solving**
Course Code **CS3111**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Students should be able to Approach the programming tasks using techniques learned in Theory and write pseudo-codesbased on the requirements of the problem.	2	None
CO2	Students should be able to Use the comparisons and limitations of the various programming constructs andchoose the right one for the task in hand.	2	S
CO3	Students should be able to Write the program based on numerical techniques learned and able to edit, compile, debug, correct, recompile and run it.	2	S
CO4	Students should be able to Develops the knowledge of different software on different Operating System Platform such as Linux/Windows (Open Source and Licensed) with understanding of different IDE	2	Emp
CO5	Students should be able to Makes students gain a broadperspective about the uses of computers in engineering industry	1	Emp

Course Name **Programming with C for Problem Solving Lab**
Course Code **CS3149**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)

Registrar
Quantum University

CO1	Students should be able to Approach the programming tasks using techniques learned in Theory and write pseudo-codesbased on the requirements of the	2	Emp
CO2	Students should be able to Use the comparisons and limitations of the various programming constructs and choose the right one for the task in hand.	2	S
CO3	Students should be able to Write the program based on numerical techniques learned and able to edit, compile, debug, correct, recompile and run it.	2	Emp

Course Name **Digital Electronics and Logic Design**
Course Code **CS3112**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	The Students should be able to Learn the Fundamental of Digital Electronics like number systems, inter conversion and binary codes.	2	Emp
CO2	The Students should be able to Understand Boolean algebra, k-map minimization, logic gates and NAND NOR implementation.	2	Emp
CO3	The Students should be able to Understand, analyze and design various combinational circuits.	2	Emp
CO4	The Students should be able to Understand sequential circuits, analyse and design flip flops and counters.	2	S
CO5	The Students should be able to Identify basic requirements for a design of memory devices	1	Emp

Course Name **Digital Electronics and Logic Design Lab**
Course Code **CS3143**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Students should be able to Realize truth tables of different logic gates like OR,AND,NOT AND XOR. They will also learn Functions using universal gates.	2	Emp
CO2	Students should be able to Design and implement combinational circuits like half adder/full adder, half subtractor/full subtractor, code converters, comparators, MUX/DEMUX	2	S
CO3	Students should be able to Design and implement sequential circuits like flip-flops, counters and shift registers	2	Emp

Registrar
Quantum University

Course Name **English for Engineers I**
Course Code **EG3105**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Students should be able to Learn the fundamentals of communication process used within the organization.	2	Emp
CO2	Students should be able to Learn about the different forms of Business Communication.	2	Emp
CO3	Students should be able to Learn about the different forms of Business Communication.	2	S
CO4	Students should be able to Learn presentation techniques and soft skills.	2	Ent
CO5	Students should be able to Understand Value-based Text Readings.	1	Emp

Course Name **Engineering Mathematics I**
Course Code **MA3105**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Students should be able to Learn the basic principles of multi-variable calculus with their proofs. They should be able to classify partial differential equations and transform them into canonical form. They will also understand how to extract information from partial derivative models in order to interpret reality.	2	Emp
CO2	Students should be able to Understand and learn how to find the area and volume of any region and solid body respectively by integral and also find the moments of inertia for a thin plate in plane.	2	Emp
CO3	Students should be able to Understand theorems related to directional derivative of gradient and reproduce its proof. They should be able to Explain the concept of a vector integration in a plane and in space.	2	S
CO4	Know basic application problems described by second order linear differential equations with constant coefficients. They should be also able to understand and solve the applications associated with Laplace Transform.	2	S
CO5	Students should be able to Solve the linear equations using matrix properties and Determine characteristic equation, eigen values, eigenvectors and diagonalizable of a matrix.	1	Emp

Registrar
Quantum University

Course Name **Graph Theory & Probability**
Course Code **CS3203**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	knowthe basics of graph along with the definitions of related terminologies.	2	S
CO2	knowthe concepts of trees along with various theorems and related algorithms.	2	Em
CO3	Know the concepts of planarity in graphs along with related algorithms.	2	S
CO4	know the various graph matrices and ways to find out the rank of the matrices.	2	En
CO5	know the concepts of combinatorics like the counting theory related to permutation and combination	1	Em

Course Name **Advance C Programming**
Course Code **CS3206**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Have deep knowledge about pointers in a programming language.	2	None
CO2	Provide functionality of array and pointers in a programming language	2	Em
CO3	Implement pointers with arrays and functions.	2	S
CO4	Make header and C library file.	2	Em
CO5	System API in a programming language.	1	None

Course Name **HTML5 & CSS**
Course Code **CS3204**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Know about the History of WWW, and evolution of HTML. They also get the knowledge about the different versions of HTML and why we use HTML5. Difference between the HTML4 and HTML5 and the new features of the HTML5. Able to understand about browser support and backward compatibility	2	S

Registrar
Quantum University

CO2	Understand about creation of DOM, doctype, Character encoding. They will gain the knowledge of the tags like script tag, Link tag etc. and also about deprecated elements. Understand about HTML5 documents (section, article, aside, header, footer, nav, dialog, and figure) and also about Web forms in detail.	2	Em
CO3	the knowledge of the History of CSS, Versions of CSS. able to know the difference between CSS and CSS3. They will also know what's new in CSS3, types of CSS3, and how to use it in HTML document?	2	S
CO4	Gain the knowledge of Selectors, Classes and Effects. Also gain the knowledge of texteffects,color,gradients,backgroundimages,masks,border, b oxeffects, animations ,transitions and transforms	2	Em
CO5	Introduction to MediataginHTML5,Geo-locationandWebHosting. able to understand about Embedding Audio &Video in Html file ,Google map and web hosting.	1	Em

Course Name **Advance C Programming Lab**
Course Code **CS3242**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Apply advanced concepts of the C programming language to create advanced C applications.	2	Em
CO2	Understand Function and Double Pointers, Recursion, Bit Manipulation, Macros.	2	S
CO3	Write high quality C code, to make yourself more marketable for higher level programming positions and be apply for real-time/embedded programming positions.	2	S

Course Name **HTML5 and CSS Lab**
Course Code **CS3204**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Design static web pages for home page that includes hyperlinks for registration page, login page and forgot password pages. Use form elements to create required web pages for the applications considered	2	Em

Quantum University Roorkee

Registrar
Quantum University

CO2	Design Home page that comprises of 3 Frames. Top frame consists of Logo and title of the web page. Left frame comprises of links to different web pages and Right frame used to display the content of web pages	2	S
CO3	Left frame has links to Login page, Registration page, Contact us etc…	2	Em

Course Name **Indian Knowledge System**
Course Code **HU3201**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	The students will be able to understand the Indian Knowledge System such as historical development, sources and scope.	2	S
CO2	The students will be able to understand the vocabulary system of Indian knowledge system.	2	S
CO3	The students will be able to understand and apply the philosophical foundations and methods of IKS.	3	N
CO4	The students will be able to execute the case studies based on the Indian knowledge system.	3	N
CO5	The students will be able to understand the influence of Indian Knowledge System on world.	2	S

Course Name **Web and Digital Analytics**
Course Code **CS3205**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Understand the basic concepts of HTML	2	None
CO2	Understand about HTML 5 and the new tags introduced inHTML5	2	Em
CO3	Understand and apply the CSS in HTML document	2	S
CO4	Understand the concept of Blog and Google web master tool.	2	Em
CO5	Understand about Google analytics and certification available on google analytics.	1	None

Course Name **Environmental Studies**
Course Code **CY3205**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)

Registrar
Quantum University

CO1	Students should be able to Correlate the human population growth and its trend to the environmental degradation and develop the awareness about his/her role towards environmental protection and preventions.	2	Em
CO2	Students should be able to Understand the solutions related to environmental problems related with the renewable & non-renewable resources.	2	S
CO3	Students should be able to Understand the importance of ecosystem and biodiversity and the method of conservation of biological diversity.	2	S
CO4	Students should be able to Understand different components of the environment and their function and the effects pollution on environment and should be able to understand the concept of sustainable development.	2	En
CO5	Students should be able to Correlate the human population growth and its trend to the environmental degradation and develop the awareness about his/her role towards environmental protection and preventions.	1	None

Course Name **Human Values and Ethics**
Course Code **PS3101**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Students should be able to Understand the significance of value inputs in a classroom, distinguish between values and skills, understand the need, basic guidelines, content and process of value education, explore the meaning of happiness and prosperity and do a correct appraisal of the current scenario in the society.	2	S
CO2	Students should be able to Distinguish between the Self and the Body, understand the meaning of Harmony in the Self the Co-existence of Self and Body.	2	Em
CO3	Students should be able to Understand the value of harmonious relationship based on trust, respect and other naturally acceptable feelings in human-human relationships and explore their role in ensuring a harmonious society.	2	S
CO4	Students should be able to Understand the harmony in nature and existence, and work out their mutually fulfilling participation in the nature.	2	Em

Registrar
Quantum University

CO5	Students should be able to Distinguish between ethical and unethical practices, and start working out the strategy to actualize a harmonious environment wherever they work.	1	Em

Course Name **Web and Digital Analytics Lab**
Course Code **CS3244**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Understand the basics of of HTML5 and CSS.	2	Em
CO2	Implement dynamic web pages using HTML5 and CSS.	2	S
CO3	Know the use of webmaster tool and the concept of Google analytics.	2	Em

Course Name **Foundation to AI, Data Science, Ethics and Foundation of Data Analysis**
Course Code **CS3223**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	overview of artificial intelligence (AI) principles and approaches	2	Emp
CO2	develop a basic understanding of the building blocks of AI as presented in terms of intelligent agents: Search, Knowledge representation, inference, logic, and learning.	2	S
CO3	understand concept of knowledge representation and predicate logic and transform the real life information in different representation.	2	Emp
CO4	understand machine learning concepts and range of problems that can be handled by machine learning	2	Emp
CO5	apply the machine learning concepts in real life problems.	1	None

Course Name **Data Analysis using Python, Numpy, Pandas, Matplotlib, and Seaborn**
Course Code **CS3224**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)

Registrar
Quantum University

CO1	Installing Python, Anaconda, Jupyter Notebook, Spyder, Introduction to Python, Components, Versions and Distributions, Difference between Python 2 and Python 3, Compiler vs Interpreter, Statically vs dynamically typed languages	2	Emp
CO2	Understand about Python REPL, variables, control structures, functions, objects, First-class functions, Immutable data, Strict and non-strict evaluation, Recursion instead of an explicit loop state, Functions, Iterators, and Generators, Writing pure functions, Functions as first-class objects, Using strings, tuples and named tuples	2	Emp
CO3	get the knowledge of Using lists, dicts, and sets, The Itertools Module, Best Practices, Clean coding, Reading data files into Python, manipulating rows and columns in files, writing files, Introduction to python libraries	2	Emp
CO4	Gain the knowledge of Data validation and matching, Methods for detecting outliers, Outlier treatment, Creating derived variables and feature engineering, Basic exploratory data analysis	2	Ent
CO5	understand the Curve fitting	1	None

Course Name **Data Science Foundation**
Course Code **CS3208**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	The students are expected to learn different concepts needed for the proper functioning of a data science.	2	S
CO2	The students are expected to learn different types of applications, the importance of data science and features of the same.	2	Emp
CO3	The students are expected to develop simple data science using App inventor	2	S
CO4	The students are expected to learn statistical analysis of data.	2	Ent
CO5	The students are expected to learn to build and assess data-based models.	1	Emp

Course Name **English for Engineers II**
Course Code **EG3209**

Registrar
Quantum University

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	The objective of this course is to introduce students to the theory, fundamentals and tools of communication.	2	Emp
CO2	To help the students become the independent users of English language.	2	Emp
CO3	To develop in them vital communication skills which are integral to their personal, social and professional interactions.	2	S
CO4	The syllabus shall address the issues relating to the Language of communication.	2	S
CO5	Students will become proficient in professional communication such as interviews, group discussions, office environments, important reading skills as well as writing skills such as report writing, note taking etc.	1	Emp

Course Name **Computer Fundamentals and Organization**
Course Code **CS3209**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Understanding the concept of input and output devices of Computers	2	S
CO2	Learn the functional units and classify types of computers, how they process information and how individual computers interact with other computing systems and devices.	2	Emp
CO3	Understand an operating system and its working, and solve common problems related to operating systems	2	S
CO4	Learn basic word processing, Spreadsheet and Presentation Graphics Software skills.	2	Ent
CO5	Study to use the Internet safely, legally, and responsibly	1	Emp

Course Name **Foundation Course on Mobile Application-CAP I**
Course Code **CS3210**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)

Registrar
Quantum University

CO1	Students will be able to demonstrate their understanding of the fundamentals of Android operating systems	2	S
CO2	Students will be able to demonstrate their skills of using Android software development tools	2	Emp
CO3	Students will be able to demonstrate their ability to develop software with reasonable complexity on mobile platform	2	S
CO4	Students will be able to demonstrate their ability to deploy software to mobile devices	2	Ent
CO5	Students will be able to demonstrate their ability to debug programs running on mobile	1	Emp

Course Name **Data Structure and Programming**
Course Code **CS3301**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	The Students should be able to Understand the concept of Dynamic memory management, data types, algorithms, ADT,pointer, c programming, iteration method, efficiency of recursion	2	Emp
CO2	The Students should be able to Understand the concepts of stack ,queue , linked list and implementation of insertion and deletion operation	2	Emp
CO3	The Students should be able to Study about different types of tree, and how it will implement	2	Emp
CO4	The Students should be able to Implement the different type of sorting searching algorithm	2	Emp
CO5	The Students should be able to Implement the different types of graphs and how it will traverse using less cost	1	Emp

Course Name **Digital Electronics**
Course Code **EC3306**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	The Students should be able to Learn the Fundamental of Digital Electronics like number systems, inter conversion and binary codes.	2	Emp
CO2	The Students should be able to Understand Boolean algebra, k-map minimization, logic gates and NAND NOR implementation.	2	Emp
CO3	The Students should be able to Understand, analyze and design various combinational circuits.	2	Emp

Quantum University Roorkee

Registrar
Quantum University

CO4	The Students should be able to Understand sequential circuits, analyse and design flip flops and counters.	2	S
CO5	The Students should be able to Identify basic requirements for a design of memory devices	1	Emp

Course Name **Data Structure Programming Lab**
Course Code **CS3340**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	The Students should be able to Know about Database Management System, a description of the Database Management structure, a Database, basic foundational terms of Database, Understand the applications of Databases, Explain & use design principles for logical design of databases, including the E -R method and normalization approach.	2	Emp
CO2	The Students should be able to Utilize the knowledge of basics of SQL and construct queries using SQL, Use commercial relational database system (Oracle) by writing Queries using SQL, Apply SQL commands to destroy and alter tables and views, Write queries in relational algebra using a collection of operators, Use their knowledge of SQL query to write nested and correlated queries, Apply aggregate operators to write SQL queries that are not expressible in relational algebra.	2	Emp
CO3	The Students should be able to Apply normalization for the development of application software's. Enter or remove data from Forms, Demonstrate to modify Forms,	2	Emp
CO4	The Students should be able to Know about Transaction system, Testing of serializability, Serializability of schedules, conflict & view serializable schedule, deadlock handling techniques.	2	Emp
CO5	The Students should be able to Know about Concurrency control and locking Techniques for concurrency control with types of concurrency control techniques, Time stamping protocols for concurrency control, validation based protocol, multiple granularity, Multi version schemes, Recovery with concurrent transaction.	1	Emp

Course Name **Data Base Management System**
Course Code **CS3305**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	The Students should be able to Know about Database Management System, a description of the Database Management structure, a Database, basic foundational terms of Database, Understand the applications of Databases, Explain & use design principles for logical design of databases, including the E -R method and normalization approach.	2	Emp
CO2	The Students should be able to Utilize the knowledge of basics of SQL and construct queries using SQL, Use commercial relational database system (Oracle) by writing Queries using SQL, Apply SQL commands to destroy and alter tables and views, Write queries in relational algebra using a collection of operators, Use their knowledge of SQL query to write nested and correlated queries, Apply aggregate operators to write SQL queries that are not expressible in relational algebra.	2	Emp
CO3	The Students should be able to Apply normalization for the development of application software's. Enter or remove data from Forms, Demonstrate to modify Forms,	2	Emp
CO4	The Students should be able to Know about Transaction system, Testing of serializability, Serializability of schedules, conflict & view serializable schedule, deadlock handling techniques.	2	Emp
CO5	The Students should be able to Know about Concurrency control and locking Techniques for concurrency control with types of concurrency control techniques, Time stamping protocols for concurrency control, validation based protocol, multiple granularity, Multi version schemes, Recovery with concurrent transaction.	1	Emp

Course Name **Data Structure Programming Lab**
Course Code **CS3340**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	The Students should be able to Understand the concept of Dynamic memory management, data types, algorithms,ADT,pointer, c programming, iteration method, efficiency of recursion	2	Emp

Registrar
Quantum University

CO2	The Students should be able to Understand the concepts of stack ,queue , linked list and implementation of insertion anddeletion operation	2	Emp
CO3	The Students should be able to Understand the concept of Dynamic memory management, data types, algorithms, ADT,pointer, c programming, iteration method, efficiency of recursion	2	Emp

Course Name **Digital Electronics Lab**
Course Code **EC3341**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Students should be able to Realize truth tables of different logic gates like OR,AND,NOT AND XOR. They will also learn Functions using universal gates.	2	Emp
CO2	Students should be able to Design and implement combinational circuits like half adder/full adder, half subtractor/full subtractor, code converters, comparators, MUX/DEMUX	2	Emp
CO3	Students should be able to Design and implement sequential circuits like flip-flops, counters and shift registers	2	Emp
CO4	The Students should be able to Know about Transaction system, Testing of serializability, Serializability of schedules, conflict & view serializable schedule, deadlock handling techniques.	2	Emp
CO5	The Students should be able to Know about Concurrency control and locking Techniques for concurrency control with types of concurrency control techniques, Time stamping protocols for concurrency control, validation based protocol, multiple granularity, Multi version schemes, Recovery with concurrent transaction.	1	Emp

Course Name **Data Base Management System**
Course Code **CS3305**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Students should be able to Realize truth tables of different logic gates like OR,AND,NOT AND XOR. They will also learn Functions using universal gates.	2	Emp

Quantum University Roorkee

Registrar
Quantum University

CO2	Students should be able to Design and implement combinational circuits like half adder/full adder, half subtractor/full subtractor, code converters, comparators, MUX/DEMUX	2	Emp
CO3	Students should be able to Design and implement sequential circuits like flip-flops, counters and shift registers	2	Emp

Course Name **Oracle/SQL Server Lab**
Course Code **CS3342**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Students should be able to Write and execute DDL commands	2	Emp
CO2	Students should be able to Write and execute DML command	2	Emp
CO3	Students should be able to Write and execute DCL command	2	Emp

Course Name **United Nations Development Programme**
Course Code **HU3202**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Students will learn about the Structure, Mission, Vision and Goals of UNDP	2	S
CO2	Equip the students with the knowledge of sustainable livelihoods for inclusive economic growth.	2	S
CO3	Students will learn and explore about the Human Development index to promote well being at all ages.	2	S
CO4	To impart better education on SDGs goals focusing on Gender Equality and Provide Access to Justice to All and Build Effective.	3	N
CO5	Students will develop knowledge regarding environment sustainability.	3	N

Course Name **Discrete Design Structure**
Course Code **CS3307**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)

Registrar
Quantum University

CO1	Students should be able to Understand propositions and then would be able to find out the validity of the argument.	2	None
CO2	Students should be able to understand the concepts of set along with proofs to prove equality in sets. Various operations on sets, Principle of inclusion and exclusion, and various properties of Relation.	2	S
CO3	Students should be able to Get complete knowledge of function and mapping. Types of functions	2	Emp
CO4	Students should be able to Understand the concepts of Group, Ring and Fields. Various related properties. They will also learn Lattice and types of lattice.	2	Emp
CO5	Students should be able to Solve the problems of Permutation, Probability and Combination. They will learn the concepts of counting theory along with recurrence relation and generating functions.	1	Emp

Course Name **Linux and Open Source**
Course Code **CS3304**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	The Students should be able to Know about the Open Source, Free Software, Free Software vs. Open Source software, Public Domain Software, FOSS does not mean no cost. History: BSD, The Free Software Foundation and the GNU Project.	2	S
CO2	The Students should be able to Understand about Open Source History, Initiatives, Principle and methodologies. Philosophy : Software Freedom, Open Source Development Model Licenses and Patents: What Is A License, Important FOSS Licenses (Apache,BSD,GPL, LGPL), copyrights and copylefts, Patents Economics of FOSS : Zero Marginal Cost, Income-generation opportunities, Problems with traditional commercial software, Internationalization	2	Emp
CO3	The Students should be able to Get the knowledge of the Linux – The Operating System, Open Source Software, GNU, GNU Public License, Advantages of Open Source Software, Difference between Windows and Linux.	2	Emp
CO4	The Students should be able to Gain the knowledge of Installing Linux – Hardware and Environmental Considerations, Server Design, Dual-Booting Issues, Methods of Installation, Installing Linux, Installing RedhatServer,Linux/Unix Commands,File Permissions in Linux/Unix	2	S

CO5	The Students should be able to Understand shell and Kernel programming: Why shell programming? Creating a script, Variables, Shell commands and control structures, Kernel Basics, General kernel responsibilities, Kernel organization, Kernel modules	1	Emp

Course Name **Linux and Open Source Lab**
Course Code **CS3343**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Students should be able to Understand the different kind of linux command and how to use these command in linux operating system	2	Emp
CO2	Students should be able to Give the permission in single file to user , to group ,to admin and students can implement it on server site as well as in different kind of website designing	2	S
CO3	Students should be able to Differentiate different kind of operating system and importance of every operating system	2	Emp

Course Name **Probabilistic Modelling and Reasoning with Python**
Course Code **CS3423**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	the students are expected to learn- Basics of Statistics and Probability distributions	2	Emp
CO2	the students are expected to learn-Sampling theory and Theory of Estimation	2	Emp
CO3	the students are expected to learn-Various tests of Hypothesis and Significance, Correlation and Regression and fitting of different types of curves.	2	Emp

Course Name **R Programming for Data Science and Data Analysis**
Course Code **CS3424**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)

Quantum University Roorkee

Registrar
Quantum University

CO1	The students are expected to learn-Open Source platform	2	Emp
CO2	The students are expected to learn-Machine Learning Operations and Exemplary support for data wrangling	2	Emp
CO3	The students are expected to learn-Quality plotting and graphing & Statistics	2	S

Course Name **Basics of C++ Programming**
Course Code **CS3351**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	The student should be able to understand the concept of Data types, Variables, Constant, Operators and Enums, Decision making, Loop control and Control flow.	2	Emp
CO2	The student should be able to understand the concept of Array, String, Function, String, Recursion, Pointer, Structure, Union and File input/output.	2	Ent
CO3	The student should be able to understand the concept of Dynamic memory allocation and Preprocessor	2	S
CO4	The student should be able to understand the concept of Operator overloading, Initialization and Assignment, Storage Management, Inheritance and Polymorphism.	2	Emp
CO5	The student should be able to understand the concept of file and its handling	3	Emp

Course Name **Basics of Networking and Trusted Operating Systems**
Course Code **CS3352**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	The student should be able to understand the concept of Process Management and Synchronization Memory and I/O Management.	2	Emp
CO2	The student should be able to understand the concept of Relational Algebra and SQL.	2	Ent

Registrar
Quantum University

CO3	The student should be able to understand the concept of Network Devices and Routing Algorithms.	2	S
CO4	The student should be able to understand the concept of Linux Operating System	2	Emp
CO5	Students should be able to understand about how to work with Distributed System	3	Emp

Course Name **Statistical Inference**
Course Code **CS3309**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Implement the concepts of inferential statistics in real world scenarios.	3	None
CO2	They will be able to apply hypothesis testing	3	S
CO3	Implement various statistical tools to test the homogeneity and independence.	3	Emp
CO4	Student will able to understand the Testing of hypothesis.	2	Emp
CO5	Student will able to analyze test for equality of variances.	2	Emp

Course Name **Python Programming**
Course Code **CS3310**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Understand the core programming concepts of Python Programming Language.	2	S
CO2	Apply the Looping and condition statements in Python Programming Language	2	Emp
CO3	Analyze the different options in Data Management in Python Programming Language.	2	Emp
CO4	Evaluate the importance of data transformation and its need in Python Programming Language	2	S
CO5	Develop elementary to advanced statistical methods in Python Programming environment.	1	Emp

Course Name **Python Programming**
Course Code **CS3310**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)

Registrar
Quantum University

CO1	Understand the core programming concepts of Python Programming Language.	2	S
CO2	Apply the Looping and condition statements in Python Programming Language	2	Emp
CO3	Analyze the different options in Data Management in Python Programming Language.	2	Emp
CO4	Evaluate the importance of data transformation and its need in Python Programming Language	2	S
CO5	Develop elementary to advanced statistical methods in Python Programming environment.	1	Emp

Course Name **Beginner Level -CTP (Data Science)**
Course Code **CS3311**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	The Students should be able to Understand the concept of Dynamic memory management, data types, algorithms, ADT,pointer, c programming, iteration method, efficiency of recursion	2	Emp
CO2	The Students should be able to Understand the concepts of stack ,queue , linked list and implementation of insertion and deletion operation	2	Emp
CO3	The Students should be able to Understand the concept of Dynamic memory management, data types, algorithms, ADT,pointer, c programming, iteration method, efficiency of recursion	2	Emp

Course Name **Beginner Level -CTP (Data Science) Lab**
Course Code **CS3348**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Use discrete and continuous probability distributions, including requirements, mean and variance, and making decisions	2	Emp
CO2	Identify the type of statistical situation to which different distributions can be applied	2	S
CO3	Describe the basic concepts of data science for python.	2	Emp

Course Name **Python Programming Lab**
Course Code **CS3347**

Registrar
Quantum University

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Students should be able to write programs on given values of each expressions.	2	Emp
CO2	Students should be able to write and run program by using loop functions.	2	S
CO3	Students should be able to plot the scatter matrix and test the value for the given data.	2	Emp

Course Name **Introduction to UI/UX**
Course Code **CS3312**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	By the end of this course, the students can outline about human computer interaction.	2	None
CO2	Students can identify different types of models, design process and interaction styles for developing a good user interface.	2	S
CO3	The students also can list out the different designing tools for UX designers	2	Emp
CO4	Students should be able to Understand the concepts of Views and Layout tools. Various types of Javascript forms and Functions.	2	Emp
CO5	Students should be able to know the case studies by using technologies. Various types of errors, lists and preventions they can be known.	1	Emp

Course Name **Web Programming-CAP II**
Course Code **CS3313**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Design Basic web and responsive web app development.	2	S
CO2	List different Events and Event Handler methods, Access Controls	2	Emp
CO3	Apply Data storage Concepts and Google Map integration	2	Emp

Course Name **Web Programming- CAP II Lab**
Course Code **CS3349**

Registrar
Quantum University

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Develop web pages using HTML and Cascading Styles sheets	2	Emp
CO2	Develop a dynamic web pages using JavaScript	2	S
CO3	To develop an ability to design and implement static and	2	Emp

Course Name **Object Oriented Programming Language and Systems with Java**
Course Code **CS3403**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Students should be able to Understand the use of OOPs concepts.	2	Emp
CO2	Students should be able to Solve real world problems using OOP techniques	2	Emp
CO3	Students should be able to Develop and understand exception handling, multithreaded applications with synchronization.	2	Emp
CO4	Students should be able to Design GUI based applications	2	Emp
CO5	Students should be able to Understand the use of File I/O	1	Emp

Course Name **Theory of Automata and Formal Languages**
Course Code **CS3404**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Students should be able to Explain basic models of computation, Introduce concepts in automata theory and theory of computation.	2	Emp
CO2	Identify different formal language classes and their relationships, to design grammars and automata (recognizers) for different language classes	2	Emp

Quantum University Roorkee

Registrar
Quantum University

CO3	Students should be able to Synthesize finite and pushdown automata with specific properties, Prove particular problems cannot be solved by finite or pushdown automata using the Pumping Lemma or the closure properties of regular and/or context-free languages	2	Emp
CO4	Students should be able to Design deterministic Turing machine for all inputs and all outputs, subdivide problem space based on input subdivision using constraints	2	Emp
CO5	Students should be able to Determine the decidability and intractability of computational problems, a fundamental understanding of core concepts relating to the theory of computation and computational models including decidability and intractability	1	Emp

Course Name **Object Oriented Programming Language and Systems with Java Lab**
Course Code **CS3440**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Students should be able to Understand about class & object, also able to describe constructor, & overload the Constructors with instantiating its object.	2	Emp
CO2	Students should be able to Understand about polymorphism using methods in JAVA amd also able to implement polymorphism.	2	S
CO3	Students should be able to Implement the concept of threading by extending Thread Class and Runnable Interface.	2	Emp

Course Name **Software Engineering**
Course Code **CS3401**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Students should be able to Appreciate the engineering nature of software development. Describe key activities in software development and the role of modeling.	2	Emp

CO2	Students should be able to Learn how to capture software requirements and handle difficult situations in the course addresses elicitation, specification, and management of software system requirements	2	Emp
CO3	Students should be able to Explain key concepts in software development such as risk and quality; explain the basics of an object-oriented approach to software development. Describe a simple workflow for interacting with the published literature on software development.	2	S
CO4	Students should be able to Apply modern software testing processes in relation to software development and project management,Create test strategies and plans, design test cases, prioritize and execute them.	2	Emp
CO5	Students should be able to Study a body of knowledge relating to Software Engineering, Software reengineering, and maintenance; Understand the principles of large scale software systems, and the processes that are used to build them;	1	Emp

Course Name **Computer Network**
Course Code **CS3402**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Students should be able to Build an understanding of the fundamental concepts of computer networking. To master the concepts of protocols, network interfaces, and physical transmission media.	2	Emp
CO2	Students should be able to Have knowledge of terminology and concepts of the OSI reference model and the TCP/IP reference model. Study data link layer concepts, design issues, and responsibilities	2	Emp
CO3	Students should be able to Analyze, specify and design the topological and routing strategies for an IP based networking infrastructure	2	Emp
CO4	Students should be able to Study Transport layer services and protocols and gain knowledge about connection establishment and termination	2	Emp
CO5	Students should be able to Have a basic knowledge of the use of cryptography and network security	1	Emp

Course Name **Computer Network Lab**

Registrar
Quantum University

Course Code **CS3442**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Students should be able to Learn about basics of computer networking and IP addressing.	2	Emp
CO2	Students should be able to Analyse different simulation tools such as NS2	2	Emp
CO3	Students should be able to Learn about framing technique	2	Emp

Course Name **Case Tools and Testing Lab**
Course Code **CS3441**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Students should be able to Understand and identify various software testing problems, and solve these problems by designing and selecting software test models, criteria, strategies, and methods.	2	Emp
CO2	Students should be able to Apply software testing knowledge and engineering methods.	2	Emp
CO3	Students should be able to Improve software testing knowledge and engineering methods.	2	S

Course Name **Machine Learning and Pattern Recognition**
Course Code **CS3523**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	The student should be able to understand Basic Algorithms of Machine Learning	2	Emp
CO2	The student should be able to understand about Supervised and Unsupervised Learning	2	S
CO3	The student should be able to learn about Linear Regression, Classification, Tree, PCA, SVD, SVM, Resampling Methods and Optimization Techniques	2	S

Course Name **Machine Learning Practical with Python, Scikit-learn, Matplotlib, TensorFlow**
Course Code **CS3524**

Registrar
Quantum University

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Experiment with basic Algorithms of Machine Learning	3	Emp
CO2	Experiment with Supervised and Unsupervised Learning	3	Emp
CO3	Experiment with Linear Regression, Classification, Tree, PCA, SVD, SVM, Resampling Methods and Optimization Techniques.	3	S

Course Name **Advanced Networking**
Course Code **CS3451**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	The student should be able to understand the Networking and Internet fundamentals.	2	Emp
CO2	The student should be able to implement the basic Networking commands.	2	Ent
CO3	The student should be able to implement the Advanced Networking	2	Emp

Course Name **Basis of Information Security**
Course Code **CS3452**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	The student should be able to understand the Basics of information security.	2	Emp
CO2	The student should be able to implement the Basics of information security.	2	Ent
CO3	The student should be able to understand the Access control of information security.	2	Emp

Course Name **Advanced Networking Lab**
Course Code **CS3445**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Student should be able to understand the basic networking topology methods and their application	2	Emp
CO2	Student should be able to implement the wireless LANs and design access list to provide network security.	3	Emp

Registrar
Quantum University

CO3	Student should be able to troubleshoot the security policies in LANs and VLANs.	3	S

Course Name **Intermediate Level -CTP (Data Science)**
Course Code **CS3409**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Use NumPy to perform common data wrangling and computational tasks in Python.	2	Emp
CO2	Employ the concepts of Pandas to create and manipulate data structures like Series and Data Frames.	2	Ent
CO3	Describe exploratory data analysis and visualization concepts.	2	S

Course Name **Intermediate Level -CTP (Data Science) Lab**
Course Code **CS3447**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Use NumPy to perform common data wrangling and computational tasks in Python.	2	Emp
CO2	Employ the concepts of Pandas to create and manipulate data structures like Series and Data Frames.	2	Ent
CO3	Describe exploratory data analysis and visualization concepts.	2	S

Course Name **Android Application Development-CAP III**
Course Code **CS3410**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Explain Android development environment, Architecture and android components.	2	Emp
CO2	List and explain the different layouts, user interface elements.	2	Emp
CO3	Understand the android storage and data management techniques.	2	Emp

Registrar
Quantum University

Course Name **Android Application Development-CAP III Lab**
Course Code **CS3448**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Develop an android application using UI and Layouts	2	Emp
CO2	Create an android application using multiple activities	2	Emp
CO3	Create an android application implement intent methods	2	S

Course Name **Design and Analysis of Algorithm**
Course Code **CS3504**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Students should be able to Analyze the asymptotic performance of algorithms, Apply important algorithmic design paradigms and methods of analysis, Familiarizing students with specific algorithms for a number of important computational problems like sorting, searching.	2	Emp
CO2	Students should be able to Describe the divide-and- conquer paradigm and explain when an algorithmic design situation calls for it and differentiate with Greedy approach. Recite algorithms that employ this paradigm. Synthesize divide and-conquer algorithms. Derive and solve recurrences describing the performance of divide- and-conquer algorithms.	2	Ent
CO3	Students should be able to Incorporate the dynamic-programming paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize dynamic programming algorithms, and analyses them.	2	S
CO4	Students should be able to Explain the major graph algorithms and their analyses. Employ graphs to model engineering problems, when appropriate. Synthesize new graph algorithms and algorithms that employ graph computations as key components, and analyses them.	3	Emp
CO5	Students should be able to He provide understanding of classes of problems and define the class of problem as P, NP, NP Hard, NP Complete.	3	Emp

Course Name **Design and Analysis of Algorithm Lab**

Course Code **CS3541**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Students should be able to Identify the problem given and design the algorithm using various algorithm design techniques.	2	Emp
CO2	Students should be able to Students can implement various algorithms in a high level language.	2	Ent
CO3	Students should be able to Student should be analyze the performance of various algorithms.	2	S

Course Name **Operating System**
Course Code **CS3501**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Students should be able to Understand basics of Operating System,Different types osOS,and importance of OS	2	Emp
CO2	Students should be able to Describe the working of process in detail , how cpu schedule and how dead lock occur and prevent from deadlock	2	Ent
CO3	Students should be able to Understand the concepts and implementation Memory management policies and virtual memory	2	S
CO4	Students should be able to Understand the working of an OS as a resource manager, file system manager, process manager, memory manager and I/O manager and methods used to implement the different parts of OS	3	Emp
CO5	Students should be able to Understand the working of file management how data is stored into memory and how it will transmit from one side to another in computer system	3	Emp

Course Name **Operating System**
Course Code **CS3501**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)

Registrar
Quantum University

CO1	Students should be able to Understand basics of Operating System,Different types osOS,and importance of OS	2	Emp
CO2	Students should be able to Describe the working of process in detail , how cpu schedule and how dead lock occur and prevent from deadlock	2	Ent
CO3	Students should be able to Understand the concepts and implementation Memory management policies andvirtual memory	2	S
CO4	Students should be able to Understand the working of an OS as a resource manager, file system manager, process manager, memory manager and I/O manager and methods used to implement the different parts of OS	3	Emp
CO5	Students should be able to Understand the working of file management how data is stored into memory and how it will transmit from one side to another incomputer system	3	Emp

Course Name **Web Technology**
Course Code **CS3502**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Students should be able to Understand basics of Operating System,Different types osOS,and importance of OS	2	Emp
CO2	Students should be able to Describe the working of process in detail , how cpu schedule and how dead lock occur and prevent from deadlock	2	Ent
CO3	Students should be able to Understand the concepts and implementation Memory management policies andvirtual memory	2	S
CO4	Students should be able to Understand the working of an OS as a resource manager, file system manager, process manager, memory manager and I/O manager and methods used to implement the different parts of OS	3	Emp
CO5	Students should be able to Understand the working of file management how data is stored into memory and how it will transmit from one side to another incomputer system	3	Emp

Course Name **Foundation of Cloud Computing**
Course Code **CS3505**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)

Registrar
Quantum University

CO1	Students should be able to Understand the use of Cloud Computing concepts	2	Emp
CO2	Students should be able to Solve real world application development problems using Google app engine, GKE.	2	Ent
CO3	Students should be able to Understand the need of Google cloud storage options.	2	S
CO4	Students should be able to Understand the use of networking and management tools	3	Emp
CO5	Students should be able to Manage machine learning applications over the cloud.	3	Emp

Course Name **Neural Networks and Deep Learning (Vision and NLP)**
Course Code **CS3623**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	The students are expected to learn-Neural Network, Feed Forward and Backpropagation	2	Emp
CO2	The students are expected to learn-TensorFlow and Keras	2	Emp..
CO3	The students are expected to learn-RNN, CNN, Autoencoders	2	S

Course Name **Deep Learning Practical with Python, TensorFlow and Keras**
Course Code **CS3624**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	The students are expected to learn-Experiment with Neural Network, Feed Forward and Backpropagation	2	Emp
CO2	The students are expected to learn-Experiment with TensorFlow and Keras	2	S
CO3	The students are expected to learn-Experiment with RNN, CNN, Autoencoders.	2	Emp..

Course Name **Linux and Virtualization**
Course Code **CS3551**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	student should be able to install linux by using virtual machines.	2	Emp
CO2	student should be able to backup of virtual machines.	2	Emp

Registrar
Quantum University

CO3	student should be able to create connection with putty.	3	S

Course Name **Cryptography**
Course Code **CS3552**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	The student should be able to understand the concept of Digital Signature	2	Emp
CO2	The student should be able to understand the concept of Data Integrity Algorithms	2	Emp
CO3	The student should be able to understand the concept of Public Key Infrastructure	2	S

Course Name **Advance of Information Security**
Course Code **CS3553**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	The student should be able to understand the concepts of information security	2	Emp
CO2	Students will able to understand and implement the various kind of algorithm for security	2	Ent
CO3	The student should be able to undersand the concepts of digital signature and get how to implement it on latest technology	2	Emp

Course Name **Advanced Level-CTP(Data Science)**
Course Code **CS3509**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Students should be able to Develop a deeper understanding of the linear regression model and its limitations.	2	Emp
CO2	Students should be able to Demonstrate the concepts of various classification techniques.	3	Ent
CO3	Students should be able to Differentiate between clustering and classification.	3	S

Course Name **R Programming**
Course Code **CS3510**

Registrar
Quantum University

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	The student should be able to Know the procedure to read and write different format of data set into R environment.	2	Emp
CO2	The student should be able to Understand the uniqueness in R programming with the help of apply function in R programming language.	2	Ent
CO3	The student should be able to Apply different options in I/O operations in R programming Language.	2	S
CO4	The student should be able to Know the interpretation of summary statistics and testing of hypothesis.	3	Emp
CO5	The student should be able to Know the built-in functions for graphs and non-parametric testing of hypothesis in R.	3	Emp

Course Name **R Programming**
Course Code **CS3510**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	The student should be able to Know the procedure to read and write different format of data set into R environment.	2	Emp
CO2	The student should be able to Understand the uniqueness in R programming with the help of apply function in R programming language.	2	Ent
CO3	The student should be able to Apply different options in I/O operations in R programming Language.	2	S
CO4	The student should be able to Know the interpretation of summary statistics and testing of hypothesis.	3	Emp
CO5	The student should be able to Know the built-in functions for graphs and non-parametric testing of hypothesis in R.	3	Emp

Course Name **R Programming**
Course Code **CS3510**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	The student should be able to Know the procedure to read and write different format of data set into R environment.	2	Emp

CO2	The student should be able to Understand the uniqueness in R programming with the help of apply function in R programming language.	2	Ent
CO3	The student should be able to Apply different options in I/O operations in R programming Language.	2	S
CO4	The student should be able to Know the interpretation of summary statistics and testing of hypothesis.	3	Emp
CO5	The student should be able to Know the built-in functions for graphs and non-parametric testing of hypothesis in R.	3	Emp

Course Name **R Programming Lab**
Course Code **CS3548**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Students should be able to understand the basic concepts of R programming language.	2	Emp
CO2	Students should be able to understand the data structures in R programming language.	2	Ent
CO3	Students should be able to understand the important packages and functions in R programming language.	2	S

Course Name **Advanced Level-CTP(Data Science) Lab**
Course Code **CS3547**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Students should be able to Develop a deeper understanding of the linear regression model and its limitations.	2	Emp
CO2	Students should be able to Demonstrate the concepts of various classification techniques.	2	Ent
CO3	Students should be able to Differentiate between clustering and classification.	3	S

Course Name **Agile Practices**
Course Code **CS3511**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Students should be able to understand fundamentals of Agile methodology.	2	Emp
CO2	Students should be able to Explain agile principles.	2	Ent
CO3	Students should be able to explain Code Structure	3	S

Registrar
Quantum University

Course Name **iOS Application Development - CAP IV**
Course Code **CS3512**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Gain knowledge of iOS Architecture and Xcode	2	S
CO2	Gain Knowledge on Objective-C concepts	2	Emp
CO3	Gain Knowledge on Swift programming	2	Emp
CO4	Understand MVC and its importance in iOS App development	2	Emp
CO5	Understand Files and SQLite to Store and Retrieve information	2	Emp

Course Name **iOS Application Development - CAP IV**
Course Code **CS3545**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Gain knowledge of iOS Architecture and Xcode	2	Emp
CO2	Gain Knowledge on Objective-C concepts	2	Ent
CO3	Gain Knowledge on Swift programming	3	S

Course Name **Project Based Learning using JAVA**
Course Code **CS3513**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Students should be able to understand the use of OOPs concepts.	2	**s**
CO2	Students should be able to solve real world problems using OOP techniques.	3	**Emp**
CO3	Students should be able to develop and understand exception handling, multithreaded applications with synchronization.	3	**Emp**
CO4	Students should be able to design GUI based applications	3	**Emp**

Registrar
Quantum University

CO5	Students should be able to understand the use of File I/O.	3	**Emp**

Course Name **Project Based Learning using JAVA Lab**
Course Code **CS3549**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Students should be able to use Object Oriented Programming concepts for problem solving.	3	Emp
CO2	Students should be able to Apply JDBC to provide a program level interface for communicating with database using java programming	3	Emp
CO3	Students should be able to Apply the garbage collection for saving the resources automatically	3	Emp

Course Name **Compiler Design**
Course Code **CS3604**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Students should be able to Realize basics of compiler design and apply for real time applications, To develop an awareness of the function and complexity of modern compilers	2	Emp
CO2	Students should be able to Understand the different types of parsing techniques and should be in a position to solve the problem	2	Ent
CO3	Students should be able to Analyse the program and minimize the code which helps in reducing the no. of instructions in a program and also utilization of registers in an effective way.	2	S
CO4	Students should be able to Draw the flow graph for the intermediate codes,To apply the optimization techniques to have a better code for code generation	3	Emp
CO5	Students should be able to Apply the code generation algorithms to get the machine code for the optimized code, To represent the target code in any one of the code formats,To understand the machine dependent code	3	Emp

Course Name **Compiler Design Lab**
Course Code **CS3641**

Registrar
Quantum University

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Students should be able to Realize basics of compiler design and apply for real time applications, To develop an awareness of the function and complexity of modern compilers.	2	Emp
CO2	Students should be able to Analyse and implement the program and minimize the code which helps in reducing the no. of instructions in a program and also utilization of registers in an effective way.	2	Ent
CO3	Students should be able to Understand and implement the dif	2	S

Course Name **Technical VAP I**
Course Code **CS3642**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Understand the concepts of HTML,CSS	2	Emp
CO2	Understand the concepts of python language	2	Ent
CO3	Understand the concepts of Machine learning	2	S
CO4	Understand the concepts of PHP language	3	Emp
CO5	Understand the concepts of C++ programming language	3	Emp

Course Name **Artificial Intelligence**
Course Code **CS3601**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Students should be able to Understand the concepts of artificial intelligence. also learn the various searching methods.	2	Emp
CO2	Student will understand the various types of knowledge representation techniques required in artificial intelligent machines	2	Ent
CO3	Student will Understand reasoning during the condition of uncertainty	2	S
CO4	Student will Learn about different types of learning methods	3	Emp
CO5	Student will Learn about the various methods of reducing the search path in a problem.	3	Emp

Course Name **Distributed Operating System**

Registrar
Quantum University

Course Code **CS3603**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Students should be able to Understand the use of DOS concepts, its architecture and various challenges and issues in DOS network	2	Emp
CO2	Students should be able to Understand the DOS processes, synchronization and communication	2	Ent
CO3	Students should be able to Develop and understand exception handling, multithreaded applications and recovery	2	S
CO4	Students should be able to Understand DFS implementation, page and object based distributed shared memory, replacement strategy and thrashing	3	Emp
CO5	Students should be able to Develop and understand the use access control techniques, and web applications of distributed web-based system	3	Emp

Course Name **Artificial Intelligence using Python Lab**
Course Code **CS3640**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Students should be able to Understand about the basic of AI programming languages	2	Emp
CO2	Students should be able to Understand the programming concepts of LISP	2	Ent
CO3	Students should be able to Understand the programming concepts of PROLOG	2	S

Course Name **Data Science - Tools and Techniques**
Course Code **CS3723**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	The students are expected to learn- Concepts of Hadoop and HDFS	2	Emp
CO2	The students are expected to learn- Concepts of MapReduce	2	Emp
CO3	The students are expected to learn- Big data tools Pig, Hive, Spark, Zookeeper, HBase	2	Emp

Course Name **Advanced Python Programming Lab**
Course Code **CS3648**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Student should be able to implement different library functions	2	Emp
CO2	Student should be able to perform different programs for different libaries in Python	2	S
CO3	Student should be able to implement real problem based projects based on machine learning, deep learning etc.	2	S

Course Name **Operating System Lab**
Course Code **CS3649**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Students should be able to identify basic components of operating system.	2	Emp
CO2	Students should be able to conceptualize synchronization amongst various components of a typical operating system.	2	S
CO3	Students should be able to understand and simulate activities of various operating system components.	2	Emp

Course Name **Digital Forensics Part-2**
Course Code **CS3652**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	The student should be able to understand the Windows Forensics.	2	Emp
CO2	The student should be able to understand the Live Forensics.	2	Ent
CO3	The student should be able to understand Password recovery techniques.	2	Emp

Course Name **Introduction to Risk Management and Cyber Laws**
Course Code **CS3653**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	The student should be able to understand the Introduction to Standards, frameworks and guidelines.	2	Emp
CO2	The student should be able to implement the Email offences and Investigation.	2	Ent
CO3	The student should be able to understand the Server log offences and Investigation	2	Emp

Course Name **Malware Analysis and Reverse Engineering I**
Course Code **CS3654**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	The student should be able to understand the Windows Internals - Part 1	2	Emp
CO2	The student should be able to implement the C/C++ from reverse engineering perspective.	3	Ent
CO3	The student should be able to implement the x86 Assembly language.	3	Emp

Course Name **Linux Administration Lab**
Course Code **CS3643**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	The student should be able to realize basics of compiler design and apply for real time applications, To develop an awareness of the function and complexity of modern compilers.	2	Emp
CO2	The student should be able to analyse and implement the program and minimize the code which helps in reducing the no. of instructions in a program and also utilization of registers in an effective way.	3	Emp
CO3	The student should be able to understand and implement the different types of parsing techniques and should be in a position to solve the problem	2	S

Registrar
Quantum University

Course Name **Data Visualization Techniques**
Course Code **CS3613**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Understand the fundamental design principles and different types of data visualization.	2	Emp
CO2	Identify both positive and negative impacts of data-informed decision across a variety of domains.	2	Ent
CO3	Apply the fundamental concepts of data visualization to define a project in your field of study.	2	S
CO4	Practice the core principles using widely available tools (e.g. Tableau).	3	Emp
CO5	Demonstrate the best practice that presents your story in the process of creating data visualization	3	Emp

Course Name **Data Visualization Techniques Lab**
Course Code **CS3647**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Understand the fundamental design principles and different types of data visualization.	2	Emp
CO2	Identify both positive and negative impacts of data-informed decision across a variety of domains.	2	Ent
CO3	Apply the fundamental concepts of data visualization to define a project in your field of study.	2	S

Course Name **Natural Language Processing using Python**
Course Code **CS3614**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Outline the basic concepts of natural language processing and its important terminologies	2	Emp
CO2	Analyse the key role of syntactic parsing and semantic analysis in natural language processing in unstructured data	4	Ent
CO3	Create language generation as a part of sentimental analysis	2	S
CO4	Create corpus for text analysis in natural language processing	3	Emp
CO5	Evaluate important statistical techniques used in natural language processing	3	Emp

Registrar
Quantum University

Course Name **Server Side Scripting**
Course Code **CS3615**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	To provide students with an understanding the concept of server side scripting and frameworks.	2	Emp
CO2	To teach students how to develop environment and concepts of various databases use for dynamic web application	2	Ent
CO3	Understand deployment with Docker	3	S

Course Name **Server Side Scripting**
Course Code **CS3615**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	To provide students with an understanding the concept of server side scripting and frameworks.	2	Emp
CO2	To teach students how to develop environment and concepts of various databases use for dynamic web application	2	Ent
CO3	Understand deployment with Docker	3	S

Course Name **DevOps Overview**
Course Code **CS3616**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	To understand the basic concepts of DevOps	2	Emp
CO2	To understand the software development concepts	4	Ent
CO3	To understand the agile methodology involved in DevOps	2	S
CO4	To understand the application of DevOps and CI/CD.	3	Emp
CO5	To understand the culture, automation, measurement, sharing and configuration	3	Emp

Course Name **System Administration**
Course Code **CS3701**

Registrar
Quantum University

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	To introduce the fundamentals of System Administration.	2	Emp
CO2	To demonstrate the Process of Managing User Accounts, File Management, Configuring Firewall Security	2	S
CO3	To comprehend and analyse the File System Management & Configuring TCP/IP Networking	2	S
CO4	To understand the Network Address Translation, Role of Network Information System with Backup & Recovery by a system administrator.	2	Ent
CO5	After the completion of the course, the students will gain knowledge about System Administration or Windows Administration.	1	Emp

Course Name **Technical VAP II**
Course Code **CS3742**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Understand Object oriented programming (Advanced C++,Java)	2	Emp
CO2	Understand Python with Machine learning	2	Emp
CO3	Understand Advanced Data structures	2	Emp
CO4	Understand Advanced Database Management System	2	Emp
CO5	Understand Trends in Web technology	1	Emp

Course Name **System Administration Lab**
Course Code **CS3740**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	To explain the importance of Software installation concepts.	2	Emp
CO2	To Understand Multi-user basics, politics, policies and ethics techniques using programming.	2	Emp
CO3	To Identify and learn Automating Administrative Tasks.	2	Emp

Course Name **BIG Data and Business Intelligence**
Course Code **CS3702**

Registrar
Quantum University

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	To understand big data technologies used in storage, analysis & data manipulation.	2	Emp
CO2	To understand the concept of BIG data in Business Intelligence.	2	S
CO3	To understand the basics of design and management of BI systems, Recognize the key concepts of Hadoop framework, map reduce.	2	S
CO4	To expose students to real market problems deriving solutions from business intelligence.	2	Emp
CO5	Explore and use the data warehousing wherever necessary, Manage practical BI systems.	1	Emp

Course Name **Optimization Techniques**
Course Code **CS3709**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Find the appropriate algorithm for allocation of resources to optimize the process of assignment.	2	Emp
CO2	Explain the theoretical workings of sequencing techniques for effective scheduling of jobs on machines.	2	S
CO3	Identify appropriate equipment replacement technique to be adopted to minimize maintenance cost by eliminating equipment break-down.	2	S
CO4	Apply the knowledge of game theory concepts to articulate real-world competitive situations to identify strategic decisions to counter the consequences.	2	Ent
CO5	Demonstrate the various selective inventory control models to analyse and optimize inventory systems.	1	Emp

Course Name **Optimization Techniques Lab**
Course Code **CS3732**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Find the appropriate algorithm for allocation of resources to optimize the process of assignment.	2	Emp

CO2	Explain the theoretical workings of sequencing techniques for effective scheduling of jobs on machines.	2	S
CO3	Identify appropriate equipment replacement technique to be adopted to minimize maintenance cost by eliminating equipment break-down.	2	S

Course Name **NoSQL Database Technologies**

Course Code **CS3710**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Understanding NoSQL Databases, and its futures Limitations of Relational Databases, Comparing NoSQL with RDBMS	2	Emp
CO2	Understand Managing Different Data Types	2	S
CO3	Understand the Technical Evaluation, Choosing NoSQL, Search Features	2	S
CO4	Understanding about data storage and processing techniques.	2	Emp
CO5	Applying the various queries used in NoSQL databases.	3	Emp

Course Name **NoSQL Database Technologies Lab**
Course Code **CS3748**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Understanding NoSQL Databases, and its futures Limitations of Relational Databases, Comparing NoSQL with RDBMS	2	Emp
CO2	Understand Managing Different Data Types	2	Emp
CO3	Understand the Technical Evaluation, Choosing NoSQL, Search Features	2	Emp

Course Name **Parallel Computing**
Course Code **CS3803**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Student will be able to To understand parallel computing hardware and programming models	2	Emp
CO2	Student Will be enabled to be conversant with performance analysis and modeling of parallel programs.	2	Emp
CO3	Student will be able to Understand the logic to parallelize the programming task and operating system requirements to qualify in handling the parallelization	2	S
CO4	Student will be able to Describe different parallel architectures, inter-connect networks, programming models.	2	Emp

Registrar
Quantum University

CO5	Student will be able to Develop an efficient parallel algorithm to solve given problem.Analyze and measure performance of modern parallel computing systems.	1	Emp

Course Name **Computer Organization and Architecture**
Course Code **CS3801**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	To recognize the developing trends in Cyber law	2	Emp
CO2	To understand legislation impacting cyberspace in the current situation.	2	Emp
CO3	To generate better awareness to battle the latest kinds of cybercrimes impacting all investors in the digital and mobile network.	2	S
CO4	To Make Learner Conversant With The Social And Intellectual Property Issues Emerging From 'Cyberspace	2	Emp
CO5	To Explore The Legal And Policy Developments In Various Countries To Regulate Cyberspace	1	Emp

Course Name **Cyber Laws and Security Policies**
Course Code **CS3804**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	To understand basic structure and operation of a digital computer system.	2	Emp
CO2	To introduce the processor architectures, memory organization and mapping techniques to students.	2	S
CO3	To be able to analyze the design of arithmetic and logic unit and understanding of the fixed point and floating point arithmetic operations.	2	S
CO4	To give the students an elaborate idea about the different memory systems and buses.	2	Emp
CO5	To understand the hierarchical memory system, cache memories and virtual memory, I/O Communication	1	Emp

Course Name **Text Analytics**
Course Code **CS3809**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)

Quantum University Roorkee

Registrar
Quantum University

CO1	Introduction to text pre-processing, terminologies related with text processing, challenges of text pre-processing, tokenization, sentence segmentation	2	Emp
CO2	Explain the text analytics framework.	2	S
CO3	Analyze various sources of text data.	2	S
CO4	Measure machine learning model performance with appropriate metrics.	2	Emp
CO5	Interpret the results, gain insights, and recommend possible actions from analytics performed on text data.	1	Emp

Course Name **SOCIAL MEDIA ANALYTICS**
Course Code **CS3810**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Understand the important terminologies and analytics techniques in social media analytics.	2	Emp
CO2	Analyse the twitter data and conclude the important finding and insights of the society thought on particular issues.	2	S
CO3	Analyse the facebook data and conclude the important finding and insights of the society thought on particular issues.	2	S
CO4	Analyse the Instagram profile and find out the interesting insights.	2	Emp
CO5	Analyse the GitHub profile and find out the latest trending article in GitHub.	1	Emp

Course Name **Dockers and Kubernetes**
Course Code **CS3813**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Develop Containerized applications and implement continuous integration using Docker, explaining different types of cloud deployment and service models.	2	Emp
CO2	Create own images and build the repository.	2	Emp
CO3	Utilize Docker Orchestration and Service discovery features.	2	S
CO4	Apply development tools, frameworks, platforms, libraries and packages to test hardware and software systems.	2	Emp
CO5	Evaluate the fundamentals of solution architecture to provision cloud infrastructure.	1	Emp

Course Name **Application Development Using React Native**

Registrar
Quantum University

Course Code **CS3814**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Understand React Native	2	Emp
CO2	Build SPA using ReactJS	2	Emp
CO3	Build Cross Platform Apps using React Native	2	S
CO4	Test React Native Apps in different Mobile OS	2	Emp
CO5	Understand how to test Native Apps	1	Emp

Course Name **Fault Tolerant Computing**
Course Code **CS3807**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	The course will provide the students a background so that they can: understand techniques to model faults and know how to generate tests and evaluate effectiveness;	2	Emp
CO2	evaluate reliability of systems with permanent and temporary faults;	2	Emp
CO3	determine applicability of these forms of redundancy to enhance reliability: spatial, temporal, procedural;	2	S
CO4	assess the relation between software testing and residual defects and security vulnerabilities,	2	Emp
CO5	devise and analyse potential solutions for emerging issues.	1	Emp

Course Name **Virtual Reality and Systems**
Course Code **CS3806**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Understand Virtual Reality and Virtual Environments	2	Emp
CO2	Understand Hardware Technologies used for 3d User Interfaces	2	Emp
CO3	Understand Software Technologies used in VRS	2	S
CO4	Understand 3D Interaction Techniques	2	Emp
CO5	Understand various Advances In 3dDUser Interfaces	1	S

Course Name **Reinforcement Learning**
Course Code **CS3821**

Registrar
Quantum University

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Knowledge of basic and advanced reinforcement learning techniques.	2	Emp
CO2	Identification of suitable learning tasks to which these learning techniques can be applied.	2	Emp
CO3	Appreciation of some of the current limitations of reinforcement learning techniques.	2	S
CO4	Training agents and evaluating performance	2	Emp
CO5	Formulation of decision problems, set up and run computational experiments, evaluation of results from experiments.	1	Emp

Course Name **Cloud Computing Fundamentals**
Course Code **CS3802**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Understand the fundamental principles of distributed computing.	2	Emp
CO2	Understand how the distributed computing environments known as Grids can be built from lower level services.	2	Emp
CO3	Understand the importance of virtualization in distributed computing and how this has enabled the development of Cloud Computing.	2	S
CO4	Understand the concept of Cloud Security.	2	Emp
CO5	Analyze the performance of Cloud Computing	1	S

Course Name **Artificial Neural Network**
Course Code **CS3811**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	To understand the importance of neural network system and its components	2	Emp
CO2	To understand the neural network learning and adaptation in data science	2	Emp
CO3	To understand the mechanism of single layer perceptron in neural network models	2	S
CO4	To understand the advantage of multilayer perceptron over single layer perceptron	2	Emp

Registrar
Quantum University

CO5	To understand broad application of neural networks in different field of businesses	1	S

Course Name **Software Project Management**
Course Code **CS3815**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Understand Project concepts and its Management	2	Emp
CO2	Explain how to do Cost Estimation	2	Emp
CO3	List the Software Quality Management techniques	2	S
CO4	Analyze Software Configuration Management – Risk Management	2	Emp
CO5	Classify the Project evaluation and emerging trends	1	S

Course Name **Continuous Integration and Continuous Deployment**
Course Code **CS3816**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	To understand the Data flow analysis.	2	Emp
CO2	Understand the Integration and Continuous deployment	2	Emp
CO3	Learn anatomy of continuous delivery pipeline.	2	S
CO4	Know the detailed concepts of different version control system	2	Emp
CO5	Understands static code analysis.	1	S

Course Name **Cryptography and Network Security**
Course Code **CS3609**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO2	Learn and Understand the Public-Key Infra	2	Ent
CO3	e able to digitally sign emails and files. Understand ulnerability assessments and the weakness of using asswords for authentication. Be able to perform simple ulnerability assessments and password audits	2	S
CO4	e able to configure simple firewall architectures	3	Emp
CO5	nderstand Virtual Private Networks	3	Emp

Course Name **Android Development**
Course Code **CS3610**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	To understand mobile application development trends and Android platform	2	Emp
CO2	To analyze the need of simple applications, game development, Location map based services	2	Ent
CO3	Students can take the knowledge of various interface application.	2	S
CO4	Students can able to link their application to google platform.	3	Emp
CO5	To be able to understand the concepts of digital marketing on android platform.	3	Emp

Course Name **Digital Image Processing**
Course Code **CS3611**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Students would be able to develop Mathematical background required for Machine learning architecture algorithmic/ Programming based on real life application using text and speech	2	Emp
CO2	Students would be able to develop the syntax and architecture of word and sentence architecture with its basic copra of Natural Language	2	Emp..
CO3	Students would be able to develop model and parsing the text for language modeling and limitations of these models also explored	2	S
CO4	Students would be able to apply applications of advanced NLP with Deep learning and machine learning framework are developed.	2	Ent
CO5	Students would be able to Find out the future direction and limitation of AI	1	S

Course Name **Natural Language Processing using Python**
Course Code **CS3625**

Registrar
Quantum University

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Students would be able to develop Mathematical background required for Machine learning architecture algorithmic/ Programming based on real life application using text and speech	2	Emp..
CO2	Students would be able to develop the syntax and architecture of word and sentence architecture with its basic copra of Natural Language	2	Emp..
CO3	Students would be able to develop model and parsing the text for language modeling and limitations of these models also explored	2	S
CO4	Students would be able to apply applications of advanced NLP with Deep learning and machine learning framework are developed.	2	Ent
CO5	Students would be able to Find out the future direction and limitation of AI	1	S

Course Name **Digital Forensics Part-1**
Course Code **CS3651**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	The student should be able to understand the Digital Evidence Acquisition Essentials.	2	Emp
CO2	The student should be able to understand the Process of Non-Live Forensics	2	Emp
CO3	The student should be able to understand the live forensics.	2	S

Course Name **Data Science for IoT**
Course Code **CS3617**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)

Registrar
Quantum University

CO1	Critically review a range of data science solutions for a variety of IoT analytics scenarios, and evaluate their efficiency for industrial applications.	2	Emp
CO2	Demonstrate critical understanding of the data science solutions development process for IoT systems.	2	Emp..
CO3	Analyse, evaluate, design and implement data science solutions for a variety of industrial IoT applications.	2	S
CO4	Apply industrial standards in developing IoT applications.	2	Ent
CO5	Demonstrate problem solving techniques and preparation for further research in the area	1	S

Course Name **DATA MODELING**
Course Code **CS3618**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Describe the importance of information within an organization	2	Emp
CO2	Understand the Systems Development Life Cycle	2	Emp
CO3	Describe the process of modeling business requirements	2	S
CO4	Apply business concepts to a data model	2	Ent
CO5	Understand the concept of data normalization	1	S

Course Name **PHP and Perl Programming**
Course Code **CS3619**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Understand the fundamental principles of PHP and Perl, including variables, data types, control structures, and functions.	2	Emp
CO2	Apply PHP and Perl to create and modify web applications and scripts, including handling user input, database integration, and error handling.	2	Emp
CO3	Analyze the performance and security issues of PHP and Perl code and recommend improvements based on best practices.	2	S
CO4	Evaluate the suitability of PHP and Perl for specific programming tasks and compare their strengths and weaknesses.	2	Ent
CO5	Create complex web applications and scripts using PHP and Perl, incorporating advanced features such as object-oriented programming, regular expressions, and modules.	1	S

Course Name **Advanced Web Technology**

Registrar
Quantum University

Course Code **CS3620**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Understand HTML5 document structure	2	Emp
CO2	Understand features of HTML5	2	Emp
CO3	Understand how play audio and video	2	S
CO4	Understand how to draw graphics	2	Ent
CO5	Understand saving content using Local Storage, Web Storage	2	S

Course Name **Wireless Networks**
Course Code **CS3703**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	To understand the concept about Wireless networks, protocol stack and standards and analyze the network layer solutions for Wireless networks	2	Emp
CO2	To study about fundamentals of internetworking of WLAN and WWAN.	2	Emp
CO3	To learn about evolution of 5G Networks, its architecture and applications.	2	S
CO4	Understand basics of propagation of radio signals and radio resource management techniques	2	Emp
CO5	Understanding emerging trends in Wireless communication like WiFi , WiFimax	1	S

Course Name **Soft Computing**
Course Code **CS3704**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	To Learn the various soft computing frame works.	2	Emp
CO2	To familiarize with design of various neural networks.	2	Emp
CO3	To exposed to fuzzy logic, Learn genetic programming	2	S
CO4	Apply various soft computing frame works .Design of various neural networks.	2	Ent
CO5	Apply genetic programming. Discuss hybrid soft computing.	1	Emp

Registrar
Quantum University

Course Name **Computer Vision**
Course Code **CS3707**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	To introduce students the fundamentals of image formation; To introduce students the major ideas, methods,	2	Emp
CO2	To introduce students the major ideas, methods, and techniques of computer vision and pattern recognition;	2	Emp
CO3	To develop an appreciation for various issues in the design of computer vision and object recognition systems;	2	Emp
CO4	To provide the student with programming experience from implementing computer vision and object recognition applications.	2	Emp
CO5	The Students should be able to build image processing applications	2	Emp

Course Name **Data Visualization**
Course Code **CS3724**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Understand the fundamental design principles and different types of data visualization.	2	Emp
CO2	Identify both positive and negative impacts of data-informed decision across a variety of domains.	2	Emp
CO3	Apply the fundamental concepts of data visualization to define a project in your field of study.	2	Emp
CO4	Practice the core principles using widely available tools (e.g. Tableau).	2	Emp
CO5	Demonstrate the best practice that presents your story in the process of creating data visualization including connecting to different data sources, assessing to the quality of the data, and converting raw data into data visualizations that provide actionable information.	2	Emp

Course Name **Sampling Methods**
Course Code **CS3711**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	To understand the basic concepts and importance of sampling over complete enumeration.	2	Emp
CO2	To understand the procedure for proportions and percentage in selecting samples.	2	Emp
CO3	To understand the importance and estimation of mean and variance of simple random sampling.	2	Emp
CO4	To understand the importance and estimation of mean and variance of stratified and systemic random sampling.	2	Emp
CO5	To understand the importance and estimation of mean and variance of cluster sampling for equal and unequal clusters.	2	Emp

Course Name **Machine Learning for Image Processing**
Course Code **CS3712**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Review the fundamental concepts of a digital image processing system.	2	Emp
CO2	Analyze images in the frequency domain using various transforms.	2	Emp
CO3	Evaluate the techniques for image enhancement and image restoration.	2	Emp
CO4	Categorize various compression techniques.	2	Emp
CO5	Interpret Image compression standards.	2	Emp

Course Name **JavaScript Frameworks**
Course Code **CS3715**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	The students should be able to familiar with client-side Javascript frameworks and the Angular framework.	2	Emp
CO2	The students should be able to implement single page applications in Angular.	2	Emp
CO3	The students should be able to use various Angular features including directives, components and services	2	Emp
CO4	The students should be able to implement a functional front-end web application using Angular	2	Emp

Registrar
Quantum University

CO5	The students should be able to use MEAN Stack	2	Emp

Course Name **Cross Platform Application Development**
Course Code **CS3716**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	The students should be able to develop Mobile web applications	2	Emp
CO2	The students should be able to develop SPA mobile web applications using AngularJS	2	Emp
CO3	The students should be able to develop Hybrid Apps using Phonegap	2	Emp
CO4	The students should be able develop nice UI Hybrid App suing ionic	2	Emp
CO5	The students should be able to use Ionic	2	Emp

Course Name **Organization and Architecture of Computer**
Course Code **CS3705**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	To understand basic structure and operation of a digital computer system.	2	Emp
CO2	To introduce the processor architectures, memory organization and mapping techniques to students.	2	S
CO3	To be able to analyze the design of arithmetic and logic unit and understanding of the fixed point and floating point arithmetic operations.	2	S
CO4	To give the students an elaborate idea about the different memory systems and buses.	2	Emp
CO5	To understand the hierarchical memory system, cache memories and virtual memory, I/O Communication	1	Emp

Course Name **Data Compression**
Course Code **CS3706**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	To gain a fundamental understanding of data compression methods for text, images, and video.	2	Emp

Registrar
Quantum University

CO2	To understand related issues in the storage, access and use of large data sets.	2	Emp
CO3	To illustrate the concept of various algorithms for compressing text, audio, image and video.	2	S
CO4	Understand the structural basis for and performance metrics for commonly used lossy techniques.	2	Emp
CO5	Understand conceptual basis for commonly used lossy compression techniques.	1	S

Course Name **Malware Analysis and Reverse Engineering II**
Course Code **CS3751**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Understand basics of Malware Analysis and Reverse Engineering-2.	2	Emp
CO2	Comprehend the intricate concept of malware analysis.	2	Emp
CO3	Able to decode cyber security issues in malware based attacks.	2	S
CO4	Perform evaluation of user support & dynamic malware analysis	2	Emp
CO5	Learn Automated Malware Analysis Tools	1	S

Course Name **Time Series Analysis and Forecasting**
Course Code **CS3713**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	To understand the basic concepts of time series analysis.	2	Emp
CO2	To understand the elementary time series models and model evaluation techniques.	2	Emp
CO3	To understand the integration process of non-stationary data set.	2	S
CO4	To understand the importance of ARMA and ARIMA models for forecasting.	2	Emp
CO5	To understand the basic concepts and estimation procedure for VAR models.	1	S

Course Name **Advanced Machine Learning**
Course Code **CS3714**

Registrar
Quantum University

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Implement Machine learning techniques using tensorflow	2	Emp
CO2	Assess ensemble models involved in machine learning concepts	2	Emp
CO3	Understand reinforcement learning concepts of machine learning	2	S
CO4	Test the built models using validation techniques	2	Emp
CO5	Deploy the machine learning models on cloud or local server	1	S

Course Name **Web3.0**
Course Code **CS3717**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Developing a solid understanding of the key concepts and principles of Web 3.0.	2	Emp
CO2	Gaining practical experience with Web 3.0 tools and frameworks, and the ability to create decentralized applications.	2	Emp
CO3	Analyzing and evaluating Web 3.0 applications and use cases in various industries.	2	S
CO4	Understanding the challenges and opportunities presented by Web 3.0 and their potential impact on society and the economy.	2	Emp
CO5	Identifying potential investment and entrepreneurship opportunities in the Web 3.0 ecosystem.	1	S

Course Name **Advanced Android Application Development**
Course Code **CS3718**

Unit-wise Course Outcome	Descriptions	BL Level	Employability (Emp)/ Skill(S)/ Entrepreneurship (Emt)/ None (Use , for more than One)
CO1	Students will be able to use camera and location api to build Android Apps	2	Emp
CO2	Students will be able to understand services and receivers to build Android Service Apps	2	Emp
CO3	Students will be able to implement threads and graphics to build Game kind of Android Apps	2	S
CO4	Students will be able to integrate third party api to build rich Android Apps	2	Emp

Registrar
Quantum University

CO5	Students will be able to understand Universal Applications	2	S