Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Computer Applications

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BCABDA601	Major	Predictive Analytics	3	0	0	3	60	20	20	0	0

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;
*Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Objectives:
1. Understand the evolution and relevance of Analytics in the world today.
2. Explore end-to-end analytics industry use cases using the data analytics lifecycle.
3. Understand the scientific method for analytics, use cases, and the analytics team key roles.
4. Acquire technical expertise using popular open source analytics frameworks including Jupyter notebooks and Python.
5. Gain a competitive edge using low-code cloud-based platform for Analytics using IBM Watson Studio.
6. Data engineering and data modeling practices using machine learning.
7. Explore data science industry case studies: transportation, automotive, human resources, aerospace, banking and healthcare.
8. Experience teamwork agile industry practices using design thinking.
9. Engage in role-playing challenge-based scenarios to propose real-world solutions.

Course Outcomes:
1. Illustrate the interaction of multi-faceted fields like data mining, statistics and mathematics in the development of Predictive Analytics.
2. Acquaint the student with the concepts of Ordinary Least Squares & Generalized Least Squares.
3. Explain data clustering and dimension reduction techniques

SYLLABUS

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Computer Applications

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BCABDA601	Major	Predictive Analytics	3	0	0	3	60	20	20	0	0

UNIT-I

Introduction to Analytics with: Use Cases Analytics Overview, Domains, Roles, Data Analytics in Practice, Methodologies, Methods, Integrated Environment for Analytics projects, Cloud Based Analytics Lifecycle, Analytics capabilities on the cloud.

UNIT-II

Explore and Prepare Data: Business Understanding, Explore Data, Prepare Data, Understanding Data, Statistics and Representation Techniques, Data Transformation, Represent and transform Unstructured Data, Data Transformation Tools.

UNIT-III

Data Visualization and Presentation: Decision-centered visualization, Fundamentals of Visualization, Common graphs, Common tools.

UNIT-IV

Data Modeling and Machine Learning Algorithms: Overview of modeling techniques, Machine Learning techniques, Accuracy Precision & recall, Model Deployment.

UNIT-V

Machine Learning Algorithms: About Machine Learning, From Regression to neural nets, Decision tree classifier, Machine learning Framework.

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Computer Applications

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BCABDA601	Major	Predictive Analytics	3	0	0	3	60	20	20	0	0

References:

1. https://developer.ibm.com/articles/cc-beginner-guide-machine-learning-ai-cognitive/

2. http://bigdatauniversity.com/bdu-wp/ bdu-course/data-science-methodology

3. Wikipedia, "Cross Industry Standard Process for Data Mining," http://en.wikipedia.org/wiki/Cross_Industry_Standard_Process_for_Data_ Mining, http://the-modeling-agency.com/crisp-dm.pdf

4. https://www.ibm.com/blogs/business-analytics/descriptive-analytics-101-what-happened/

5. https://www.weforum.org/agenda/2015/02/a-brief-history-of-big-data-everyone-should-read/

6. https://medium.com/ibm-watson/introducing-ibm-watson-studio-e93638f0bb47

7. https://keyskill-clms.mylearnerportal.com/mod/lesson/view.php%3Fid=2808

8. https://www.ibm.com/design/language/experience/data-visualization/

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Computer Applications

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BCABDA602	Major	Cyber Security	2	0	2	3	60	20	20	30	20

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical;   C - Credit;
Q/A – Quiz/Assignment/Attendance, MST - Mid Sem Test.
*Teacher Assessment shall be based on following components: Quiz/Assignment/Project/Participation in class
(Given that no component shall exceed 10 Marks)

Course Education Objectives (CEOs):

1. To providethe detailed knowledge of security and to protect your organization against cyber threats.
2. To familiarize with the Network and Mobile security, IOT, Cloud security and Security Intelligence and SOC.

Course Outcomes (COs):

1. Understanding steps you can take to protect your organization against cyber threats and exploring.
2. Analyze the working mechanism of tools used by penetration testers and ethical hackers (network CLI tools, Telnet, SSH, Nmap, Wireshark, and many others).
3. Leverage high-end security enterprise solutions in high demand and many other top security tools and to gain real-world practice on critical threat modeling methodologies and frameworks such as MITRE, Diamond, IBM IRIS, IBM Threat Hunting, and security intelligence approaches to threat management.

.**Syllabus:**

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Computer Applications

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BCABDA602	Major	Cyber Security	2	0	2	3	60	20	20	30	20

UNIT – I
Cyber Security Landscape – Cyber Resilience:

Understand the current impact of cyber security threats: Research global cyber security trends in different geographies, familiarize with the taxonomy of cyber-attacks, Explore the enterprise cyber security domains, Explore the most frequently targeted industry sectors including: Government, Energy and Utilities, Retail and Telecom Explore the cyber resilience framework understand the cyber resilience lifecycle.

UNIT – II
Threat Intelligence and Network Security

Understand the need for a cyber-threat hunting approach: Explore cyber-attack adversary frameworks,Investigate enterprise threat protection methods, Explore industry case studies, Understand how cyber criminals use networks in the dark web to perform illicit crime activities, Learn network protection practices like DNS, VPN, Understand enterprise network security practices through the analysis of an advanced persistent threat.

Mobile and IOT Security: Explore the mobile and IoT global phenomena: Understand mobile and IoT attack surface, Explore recent most threatening IoT cyber-attack scenarios, Learn to protect your home and organization with endpoint protection practices.

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Computer Applications

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BCABDA602	Major	Cyber Security	2	0	2	3	60	20	20	30	20

UNIT – III

Application Security and Data Security:

Understand the wide adoption of industry applications: Learn web application fundamentals, Investigate application security practices, Examine the anatomy of the most dangerous applications threats, Understand the impact of data breaches and ransomware in Government and Health sectors: Research the anatomy and impact of Insider Threat and Phishing cyber-attacks, Research the anatomy and impact of Ransomware and Cyber Fraud cyber-attacks, Explore a Healthcare end-to-end industry case study.

UNIT – IV

Cloud Security:

Understand the reason of the global enterprise adoption of cloud computing: Understand the cloud security challenges brought by an integrated data, network, access infrastructure, Review the key cloud security practices for the enterprise, Explore a Telco cloud data breach scenario.

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Computer Applications

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BCABDA602	Major	Cyber Security	2	0	2	3	60	20	20	30	20

UNIT – V

Security Intelligence and SOC:

Understand the drivers behind the enterprise adoption of Security Intelligence methods and tools: Explore the characteristics of Security Information and Event Management (SIEM) platforms, Explore SIEM in Action through a real-life Phishing attempt scenario. Understand the Incident Response and Threat hunting practice: Explore the benefits of establishing a SOC (Security Operation Center), understand the roles and responsibilities of SOC Operations team.

Text Book:

1. IBM Corporation, "Cyber Security Practitioner", IBM, 2020.

Reference Book:

1. IBM Corporation, "IBM QRadar SIEM Foundations", IBM, 2017.

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Chairperson
Faculty of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Controller of Examinations
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Joint Registrar
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Computer Applications

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BCCA612	DEC	Advanced DBMS	4	0	0	4	60	20	20	0	0

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical;   C - Credit;
Q/A – Quiz/Assignment/Attendance, MST - Mid Sem Test.
*Teacher Assessment shall be based on following components: Quiz/Assignment/Project/Participation in class
(Given that no component shall be exceed 10 Marks)

Course Educational Objectives (CEOs):
- To familiarize the students with the need and scope of the subject.
- to prepare the students so that they can handle the data needed for different organizations
- To develop better understanding of the recent advancements in the field of Database Management System.
- Using simple and well drawn illustrations to develop students skills for data storage and retrieval to support the decision making process.

Course Outcomes (COs): The student will be able to
- understand the different issues involved in the design and implementation of a database system.
- understand and use the concepts of database designs and database models to solve real world problems
- develop an understanding of essential DBMS concepts such as: database security, integrity, concurrency, distributed database and intelligent database, Client/Server etc.
- apply the concepts of transaction processing for safe and secure transactions in different scenarios
- design and demonstrate the different kind of databases and use backup and recovery provisions

UNIT-I
Advanced Transaction Processing: Advanced transaction models: Save points, Nested and Multilevel Transactions, Compensating Transactions, Long Duration Transactions, Transaction Work Flows, Transaction Processing Monitors, Shared disk systems.

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Computer Applications

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BCCA612	DEC	Advanced DBMS	4	0	0	4	60	20	20	0	0

UNIT-II

Objected Oriented and Object Relational Databases: Modeling Complex Data Semantics, Specialization, Generalization, Aggregation and Association, Objects, Object Identity and its implementation, Clustering, Equality and Object Reference, Architecture of Object Oriented and Object Relational databases, Persistent Programming Languages, Cache Coherence.

UNIT-III

Parallel and Distributed Databases: Parallel architectures, shared nothing/shared disk/shared memory based architectures, Data partitioning, Intra-operator parallelism, pipelining. Distributed Data Storage – Fragmentation and Replication, Location and Fragment Transparency, Distributed Query Processing and Optimization, Distributed Transaction Modeling and concurrency Control, Distributed Deadlock, Commit Protocols, Design of Parallel Databases.

UNIT-IV

Active Database and Real Time Databases: Issues with Real time databases, Triggers in SQL, Event Constraint and Action: ECA Rules, Query Processing and Concurrency Control, Compensation and Databases Recovery, multi-level recovery.

UNIT-V

Image and Multimedia Databases: Modeling and Storage of Image and Multimedia Data, Data Structures – R-tree, k-d tree, Quad trees, Content Based Retrieval: Color Histograms, Textures etc., Image Features, Spatial and Topological Relationships, Multimedia Data Formats, Video Data Model, Audio and Handwritten Data, Geographic Information Systems (GIS).

WEB Database: Accessing Databases through WEB, WEB Servers, XML Databases.

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Computer Applications

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BCCA612	DEC	Advanced DBMS	4	0	0	4	60	20	20	0	0

Text Books:
1. Carlos Coronel and Steven Morris, "Database Systems: Design, Implementation, & Management", Cengage Learning, 13 edition ,January 1, 2018
2. Rob, Coronel "Data Base Systems: Design Implementation & Management", Cengage Learninig, 11th edition, February 4, 2014.
3. Raghu Ramakrishnan, "Database Management System" McGraw Hill, 3rd Edition, 16 June 2014
4. Korth, Silbertz, Sudarshan, "Fundamental of Database System", McGraw Hill Education; Sixth edition (1 December 2013)

Reference Books:
1. Ramez Elmasri, Shamkant B. Navathe, "**Fundamentals Of Database Systems"** Pearson; 7 edition June 18, 2015.

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Chairperson
Faculty of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Controller of Examinations
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Joint Registrar
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Computer Applications

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BCCA632	DSE	Data Analytics	4	0	0	4	60	20	20	30	20

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical;   C - Credit;
Q/A – Quiz/Assignment/Attendance, MST - Mid Sem Test.
*Teacher Assessment shall be based on following components: Quiz/Assignment/Project/Participation in class (Given that no component shall be exceed 10 Marks)

Course Educational Objectives (CEOs):

- To familiarize the students with the need and scope of the subject.
- Provide an exposure giving a strong foundation to the data analytics practices.
- create a basis for the use of advanced investigative and computational methods to convert information to useful knowledge.
- To develop an understanding of how business analytics is actually performed
- covers foundational techniques and tools required for data science and big data analytics.

Course Outcomes (Cos): After the completion of the course the student will be able to

- Understand the basic concepts of Statistical tool.
- Understand the concepts of Big data and Hadoop
- Understand the concepts of Big data analytics
- Understand the concepts of Machine Learning

PRE- REQUISITES:

This course requires the familiarity with linear algebra, calculus, matrix operations, probability theory, statistics, programming, Database Management System

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Computer Applications

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BCCA632	DSE	Data Analytics	4	0	0	4	60	20	20	30	20

UNIT-I

Measures of Central Tendency: Mean, Median, Range, Mode, Variance, Standard deviation. **Correlation and Regression:** Linear Correlation, Correlation and Causality, Linear Regression, Linear Regression with Nonlinear Substitution.

UNIT-II

Big Data: Introduction and basics, Evolution of Data Management, Definition, Importance, Big Data Types, Structured and unstructured Data, Sources of big structured data and unstructured data, Architecture of Big Data Management System, Stages of Big Data Management,

UNIT-III

Big Data Technology Foundations: Technology Components, virtualization, distributed computing, Cloud and Big Data, Integration of data types into a big data environment. **Introduction to Hadoop**: Hadoop Foundation and Ecosystem, Appliances and Big Data Warehouse, Big data Implementation, Big Data Applications.

UNIT –IV

Big Data Analytics: Introduction, Basic and Advanced Analytics, Drivers, Pillars of Analytics: descriptive, predictive and prescriptive. Core Components of analytical data architecture, Performance issues, Parallel vs. distributed processing, Shared nothing data architecture and Massive parallel processing, Elastic scalability, Data loading patterns.

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Computer Applications

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BCCA632	DSE	Data Analytics	4	0	0	4	60	20	20	30	20

UNIT-V

Machine Learning, supervised and unsupervised learning, Classification, Classification Criteria, Naive Bayes Classifier, use of regression and classification, Support Vector Machine, Unsupervised Learning and Challenges for Big Data Analytics, Clustering, Association Rule Mining.

Text Books:

1. "Big Data For Dummies" by Judith Hurwitz, Alan Nugent, Fern Halper, Marcia Kaufman, Wiley, ISBN: 978-1- 118-50422-2, 2013.
2. "Data Analytics, Models and Algorithms for Intelligent Data Analysis" by Runkler, Thomas A., Springer Vieweg , ISBN 978-3-8348-2589-6, 2013.
3. "Big Data Analytics with R and Hadoop", by Vignesh Prajapati, Packt Publication, ISBN 978-1-78216-328-2, 201.
4. "The Elements of Statistical Learning" by Hastie, Trevor, et al. Vol. 2. No. 1. New York: springer, 2009.
5. "Applied Statistics and Probability for Engineers" by Montgomery, Douglas C., and George C. Runger., John Wiley & Sons, 2010.

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Chairperson
Faculty of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Controller of Examinations
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Joint Registrar
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Computer Applications

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BCCA402	DCC	Introduction to Artificial Intelligence	4	0	0	4	60	20	20	0	0

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical;   C - Credit;
Q/A – Quiz/Assignment/Attendance, MST - Mid Sem Test.
*Teacher Assessment shall be based on following components: Quiz/Assignment/Project/Participation in class (Given that no component shall be exceed 10 Marks)

Course Educational Objectives (CEOs):

- To provide the knowledge of AI and Expert System
- To explain advance applications of AI and Fuzzy logic concept.
- To develop Knowledge representations to understand proper uses of AI applications.

Course Outcomes (COs): Students will be able to

- Identify and describe AI techniques and their roles in building intelligent machines.
- Recognize the feasibility of applying an artificial intelligence methodology for a particular problem.
- Apply fuzzy logic and reasoning to handle uncertainty and solve engineering problems.

Unit-I

Introduction: Definition, Basic elements of Artificial Intelligence (AI), Applications of AI, History of AI, Characteristics of AI applications, AI techniques

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Computer Applications

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BCCA402	DCC	Introduction to Artificial Intelligence	4	0	0	4	60	20	20	0	0

Unit-II

Knowledge Representations: Definition, Types of Knowledge: Declarative Knowledge, Procedural Knowledge, Structural Knowledge, Heuristic Knowledge, Relation between knowledge and intelligence, AI knowledge cycle, Approaches to knowledge representation, Techniques of knowledge representation.

Unit-III

Fuzzy Computing: Basic Concepts of Fuzzy Logic, Fuzzy Sets and Crisp Sets, Applications of Fuzzy Logic, Properties of Fuzzy Sets, Fuzzy and Crisp Relations, Fuzzy to Crisp Conversion Membership Functions, Interference in Fuzzy Logic, Fuzzy If – Then Rules, Fuzzification's and Defuzzification's, Fuzzy Controller.

Unit-IV

Expert Systems: Definition, advantages, characteristics, Design of expert systems – selecting a problem, Expert systems development stages, Issues in development, Expert system software engineering, Expert system life cycle.

Unit-V

Advance Issues in AI: Engineering Applications of Artificial Intelligence, Future of Artificial Intelligence, Artificial Intelligence in Healthcare, Artificial Intelligence in Education, Artificial Intelligence in Agriculture, Robotics and Artificial Intelligence, Languages used in Artificial Intelligence.

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BCCA402	DCC	Introduction to Artificial Intelligence	4	0	0	4	60	20	20	0	0

Text Readings

1. "Artificial Intelligence" by Elaine Rich and Kevin Knight, TMH.

2. "Artificial Intelligence: A Modern Approach" by Stuart Russell and Peter Norvig, 3rd edition, Pearson Education.

3. "Artificial Intelligence and Expert Systems" by D.W.Patterson,PHI.

4. Artificial Intelligence", Tata Mcgraw Hill, 2nd Edition by Rich and Knight

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Chairperson
Faculty of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Controller of Examinations
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Joint Registrar
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Computer Applications

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BCCA613	DSE	Soft Computing	4	0	0	4	60	20	20	0	0

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical;   C - Credit;
Q/A – Quiz/Assignment/Attendance, MST - Mid SEM Test.
*Teacher Assessment shall be based on following components: Quiz/Assignment/Project/Participation in class
(Given that no component shall be exceed 10 Marks)

Course Educational Objectives (CEOs):

The student should be made to:

- Learn the various soft computing frame works.
- Be familiar with design of various neural networks.
- Be exposed to fuzzy logic.
- Learn genetic programming.
- Be exposed to hybrid systems.

Course Outcomes (COs): The student will be able to:

- Use a new tool /tools to solve a wide variety of real world problems
- Find an alternate solution , which may offer more adaptability, resilience and optimization
- Identify the suitable antenna for a given communication system
- Gain knowledge of soft computing domain which opens up a whole new career option Tackle real world research problems

UNIT-I

Soft Computing: Introduction, Soft computing vs hard computing, various types of soft computing techniques, Application of soft Computing,   **Neural network**: Introduction, characteristics, learning methods, Human Brain, Function of a single neuron, evolution of artificial neural network, Difference between ANN and human brain, important technologies, applications of ANN, Neural network Architecture

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Chairperson
Faculty of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Controller of Examinations
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Joint Registrar
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BCCA613	DSE	Soft Computing	4	0	0	4	60	20	20	0	0

UNIT-II

Supervised Learning : Perceptron learning, Single layer, multilayer, Linear Separability, Widrow & Heff's learning rule/Delta rule, Hebbian Learning, Adaline , Madaline , Back propagation network, Error back propagation algorithm, derivation of EBPA, application of the neural networks learned.

UNIT -III

Counter Propagation Network: architecture functioning & characteristics of counter Propagation network, Hopfield/ Recurrent network, configuration, stability constraints, associative memory, and characteristics, limitations and applications , Hopfield v/s Boltzman machine, Adaptive Resonance Theory: Architecture ,classifications ,Implementation and training, Associative Memory.

UNIT-IV

Fuzzy Logic:- Fuzzy set theory, Fuzzy set versus crisp set, operation on Fuzzy Sets: Compliment, Intersection, Union, Product, Difference, Properties of Fuzzy sets, Crisp relation & fuzzy relations, introduction & features of membership functions, Fuzzy rule base system : fuzzy propositions, formation, decomposition & aggregation of fuzzy Rules, fuzzy reasoning, fuzzy inference systems, fuzzy decision making & Applications of fuzzy logic.

UNIT-V

Genetic Algorithm : Fundamentals, basic concepts, working principle, encoding, fitness function, reproduction, Genetic modeling: Inheritance operator, crossover, inversion & deletion, mutation operator, Bitwise operator, Generational Cycle, Convergence of GA, Applications & advances in GA, Differences & similarities between GA & other traditional methods.

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Chairperson
Faculty of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Controller of Examinations
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Joint Registrar
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Computer Applications

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BCCA613	DSE	Soft Computing	4	0	0	4	60	20	20	0	0

Text Books:

1. S, Rajasekaran & G.A. Vijayalakshmi Pai, Neural Networks, Fuzzy Logic & Genetic Algorithms,Synthesis & applications, PHI Publication.
2. S.N. Sivanandam& S.N. Deepa, Principles of Soft Computing, Wiley Publications
3. Rich E and Knight K, Artificial Intelligence, TMH, New Delhi.
4. Bose, Neural Network fundamental with Graph ,Algo.&Appl, TMH
5. Kosko: Neural Network & Fuzzy System, PHI Publication
6. Klir&Yuan ,Fuzzy sets & Fuzzy Logic: Theory &Appli.,PHI Pub. Hagen, Neural Network Design, Cengage Learning

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Chairperson
Faculty of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Controller of Examinations
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Joint Registrar
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Computer Applications

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BCCA623	DSE	Software Testing and Quality Assurance	4	0	0	4	60	20	20	0	0

Legends: L , Lecture; T , Tutorial/Teacher Guided Student Activity; P , Practical; Q/A , Quiz/Assignment/Attendance; MST , Mid Semester Test.

*Teacher Assessment shall be based on following components: Quiz/Assignment/Project/Participation in class activities, given that no component shall exceed more than 10 marks

Course Educational Objectives (CEOs):
The student should be made to:
- Understand the basic tenets of software quality and quality factors.
- Be exposed to the Software Quality Assurance (SQA) architecture and the details of SQA components.
- Understand of how the SQA components can be integrated into the project life cycle
- Be familiar with the software quality infrastructure
- Be exposed to the management components of software quality.

Course Outcomes (Cos):
At the end of the course the students will be able to:
- Utilize the concepts in software development life cycle.
- Demonstrate their capability to adopt quality standards.
- Assess the quality of software product.
- Apply the concepts in preparing the quality plan & documents.

Syllabus:

UNIT – I
INTRODUCTION TO SOFTWARE QUALITY & ARCHITECTURE
Need for Software quality – Quality challenges – Software quality assurance (SQA) – Definition and objectives – Software quality factors- McCall's quality model – SQA system and

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Chairperson
Faculty of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Controller of Examinations
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Joint Registrar
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BCCA623	DSE	Software Testing and Quality Assurance	4	0	0	4	60	20	20	0	0

architecture – Software Project life cycle Components – Pre project quality components – Development and quality plans.

UNIT – II
SQA COMPONENTS AND PROJECT LIFE CYCLE
Software Development methodologies – Quality assurance activities in the development process- Verification & Validation – Reviews – Software Testing – Software Testing implementations – Quality of software maintenance – Pre-Maintenance of software quality components – Quality assurance tools – CASE tools for software quality – Software maintenance quality – Project Management.

UNIT- III
SOFTWARE QUALITY INFRASTRUCTURE
Procedures and work instructions - Templates - Checklists – 3S developmenting - Staff training and certification Corrective and preventive actions – Configuration management – Software change control – Configuration management audit -Documentation control – Storage and retrieval.

UNIT- IV
SOFTWARE QUALITY MANAGEMENT & METRICS
Project process control – Computerized tools - Software quality metrics – Objectives of quality measurement – Process metrics – Product metrics – Implementation – Limitations of software metrics Cost of   software quality – Classical quality cost model – Extended model – Application of Cost model.

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BCCA623	DSE	Software Testing and Quality Assurance	4	0	0	4	60	20	20	0	0

UNIT- V
STANDARDS, CERTIFICATIONS & ASSESSMENTS
Quality management standards – ISO 9001 and ISO 9000-3 – capability Maturity Models-
CMM and CMMI assessment methodologies   - Bootstrap methodology – SPICE Project – SQA project process standards – IEEE st 1012 & 1028 – Organization of Quality Assurance – Department management responsibilities – Project management responsibilities – SQA units and other actors in SQA systems.

Text Books:

1. Daniel Galin, "Software Quality Assurance", Pearson Publication, 2009

Reference Books:

1. Alan C. Gillies, "Software Quality: Theory and Management", International Thomson Computer Press, 1997.
2. Mordechai Ben-Menachem "Software Quality: Producing Practical Consistent Software", International Thompson Computer Press, 1997.

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Chairperson
Faculty of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Controller of Examinations
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Joint Registrar
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Computer Applications

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BCCA633	DSE	Software Project Management	4	0	0	4	60	20	20	0	0

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical;   C - Credit;
Q/A – Quiz/Assignment/Attendance, MST - Mid Sem Test.
*Teacher Assessment shall be based on following components: Quiz/Assignment/Project/Participation in class
(Given that no component shall exceed 10 Marks)

Course Educational Objectives (CEOs):
- To outline the need for Software Project Management
- To highlight different techniques for software cost estimation and activity planning.

Course Outcomes (COs):

- At the end of the course the students will be able to practice Project Management principles while developing software.

UNIT-I
Introduction to Software Project Management and Project Evaluation

What is a Project? Importance of Software Project Management, Activities Methodologies, Categorization of Software Projects, Setting objectives, Management Principles, Project portfolio Management, Cost-benefit evaluation technology, Risk evaluation, Strategic program Management, Stepwise Project Planning, Project manager skills and job description

UNIT-II
Project Life Cycle

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Chairperson
Faculty of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Controller of Examinations
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Joint Registrar
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BCCA633	DSE	Software Project Management	4	0	0	4	60	20	20	0	0

Overview of project life cycle models, Software process and Process Models, Choice of Process models, Rapid Application development, Agile methods, Extreme Programming, Basics of Software estimation, Effort and Cost estimation techniques, Staffing Pattern.

UNIT-III
Activity Planning and Project Risk Management

Objectives of Activity planning, Project schedules, Activities, Sequencing and scheduling, Network Planning models, Forward Pass & Backward Pass techniques, Critical path (CPM) method

Introduction to Risk Management Process, Risk identification, Assessment, Monitoring, Risk Strategies (Risk Response Planning), Risk Monitoring and Control, Risk Response and Evaluation Cost schedules.

UNIT-IV
Project Management and Control

Framework for Management and control, Collection of data Project termination, Cost monitoring, Earned Value Analysis- Project tracking , Change control- Software Configuration Management, Managing contracts, Contract Management.

UNIT-V
Staffing in Software Projects and Closure of a Project
Managing people, Organizational behavior, Best methods of staff selection, Motivation, The Oldham-Hackman job characteristic model, Working in teams, Decision making, Team structures, Virtual teams, Communications genres, Communication plans.
Project Implementation, Administrative closure, Project Evaluation.

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Chairperson
Faculty of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Controller of Examinations
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Joint Registrar
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BCCA633	DSE	Software Project Management	4	0	0	4	60	20	20	0	0

Text Books:

1. Robert K. Wysocki "Effective Software Project Management", Wiley Publication, 2011.
2. Gopalaswamy Ramesh, "Managing Global Software Projects", McGraw Hill Education (India), Fourteenth Reprint 2013.
3. Bob Hughes, Mike Cotterell and Rajib Mall: Software Project Management, Fifth Edition, Tata McGraw Hill, New Delhi, 2012.
4. Walker Royce: "Software Project Management"- Addison-Wesley, 1998.

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Chairperson
Faculty of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Controller of Examinations
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Joint Registrar
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore