**PROGRAMME OUTCOMES**

**Undergraduates will be able to:**

- PO1: Discuss their new knowledge and understanding; apply new ideas in order to acquire employability/self-employment.

- PO2: Pursue higher learning programmes and become entrepreneurs.

- PO3: Recognize moral and ethical values and be socially responsible citizens in the society.

- PO4: Apply analytical, technical, problem solving, critical thinking skills, and decision-making skills in solving real life problems in one's life and in the society.

- PO5: Direct their own self-learning through MOOC courses, co-curricular activities, industrial exposures and field trainings.

- PO6: Develop their own broad conceptual background in Biological sciences, Computing sciences, Languages and culture, Management studies, Physical sciences, etc.

- PO7: Demonstrate communication skills both oral and written in personal and academic pursuits.

**PROGRAMME SPECIFIC OUTCOMES [PSO]**

- **PSO 1:** Acquire a comprehensive understanding of the evolution of human civilization in different parts of the world.

- **PSO 2:** Develop and appreciate the attitude of respective culture at the local, regional, national and global level.

- **PSO 3:** Apply the skills of rational enquiry, critical thinking, effective communication and explore the relationship between the past and the present.

- **PSO 4:** Enrich the fundamental ideas on social, economic, political and religious institutions in India through the ages.

- **PSO 5:** Identify the patterns of change and continuity over time in the context of contemporary significance.

| S No | Title of the Paper | Course Code | Course Objectives | Course Outcomes | Relevance |
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| 1 | HISTORY OF INDIA UP TO 712 A.D | HT103 | • To understand the evolution of human civilization of Ancient India<br>• To enable the students to learn the social, economic and religious condition of India.<br>• To examine the political unity, art and architecture of India.<br>• To evaluate the cultural progress of various dynasties.<br>• To assess the importance of native empires in Ancient India. | • Recall the historical evolution of Indian culture and civilization.<br>• The student would have a background understanding of the socio – economic and religious developments shaping India in its early phase.<br>• Explain the cultural and political achievements of the Mauryan kingdom.<br>• Point out the significance of the Indian culture.<br>• Recognize the native empires of India up to 712 A.D. | **national developmental needs** |
| 2 | HISTORY OF TAMIL NADU UP TO 1336 A.D. | HT104 | • To become aware of the political, social and economic developments of Tamil Nadu.<br>• To identify the contribution of | • Asses the formation of various ruling dynasties and the consequent socio – economic and political developments in Tamil Nadu.<br>• Illustrate the origin and | **local, regional Developmental needs** |

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| | | | Pallavas to art and architecture.<br>• To study the development of art and architecture under the Cholas.<br>• To evaluate the socio, economic and religious condition of Tamil Nadu under the Pandyas.<br>• To describe the advent of Islam in Tamil Nadu. | growth of Bakthi movement and the evolution of art and architecture under the Pallavas.<br>• Explain the cultural achievements of Cholas.<br>• Discuss the socio, economic and religious condition under the Pandyas<br>• Recognize about second Pandya Empire and the establishment of Madurai Sultanate. | |
| 3 | ALLIED – I: PRINCIPLES OF TOURISM | AH111 | • To enable the students to understand the basic structure and importance of tourism.<br>• To understand the various elements of tourism.<br>• To sensitize students about the various opportunities in tourism and allied sectors.<br>• To understand the techniques of promoting tourism in the contemporary period.<br>• To discuss the | • It would enable the students to realize the significance of tourism for a nation.<br>• The students understand the evolution of tourism.<br>• Assess the opportunities available in the tourism and allied sectors.<br>• The students absorb the nuances on the development of tourism.<br>• Explain the influence of tourism over the country's economy. | **Global and national developmental needs** |

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| | | | evolution of travel agency and tour operation business. | | |
| 4 | HISTORY OF INDIA (712 – 1526 A.D.) | HT203 | • To enable the students to acquire knowledge about the role of Rajputs and Delhi Sultanate.<br>• To evaluate the administration of the Delhi Sultanate.<br>• To analyze the administrative skills of Khilji dynasty.<br>• To evaluate the contribution of Sultanate to Art and Architecture.<br>• To know the historical significance of Vijayanagar empire in Medieval India. | • Recall impact of Arab invasion and the establishment of Delhi Sultanate.<br>• Evaluate the political and administrative system of the slave dynasty.<br>• Point out the administrative and Economic reforms of Khilji Dynasty.<br>• Identify the richness of the Medieval Indian Art and Architecture.<br>• Summarize the cultural contribution of the Vijayanagar Empire. | **national developmental needs** |
| 5 | HISTORY OF TAMIL NADU (1336 – 1947 A.D.) | HT204 | • To understand the socio, economic and cultural condition of the Nayaks of Madurai, Tanjore and Senji.<br>• To explain the rise of Marathas of Tanjore, Marava kingdoms of Ramnad and Sivaganga. | • Know about the Vijayanagar and Nayankara System.<br>• Highlight the conditions of Tamil Nadu under the non-Tamil rulers.<br>• Explain the Advent of the Europeans in Tamil Nadu.<br>• Identify the socio-religious reform | **Local and regional developmental needs** |

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| | | | <ul><li>To analyse the establishment of European companies and the conflict with the native rulers.</li><li>To examine the role of Christian Missionaries in the field of Education in Madras presidency.</li><li>To understand the political consciousness and the freedom movement in Madras Presidency</li></ul> | <ul><li>movements in Tamil Nadu.</li><li>Summarize the socio, economic and educational development in Tamil Nadu after independence.</li></ul> | |
| 6 | ALLIED – II: TOURISM AND TRAVEL MANAGEMENT | AH211 | <ul><li>To know about the various International organizations of the tourism industry.</li><li>To realize the potential of tourism industry in India.</li><li>To discuss the evolution of travel agency and tour operation business in India.</li><li>To know about the various regulations and acts of government to promote tourism.</li><li>To make aware of</li></ul> | <ul><li>The course introduces the students to the latest trends and various prospects in the travel and tourism industry.</li><li>The student would know the various issues on tourism planning and the role of various national and international organizations.</li><li>The course tries to provide a deeper insight into the tourism industry.</li><li>The student will understand the growth of tourism since</li></ul> | **Global national developmental needs** |

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| | | | transportation and accommodation to the domestic and international tourism. | • independence. <br> • The course examines the various modes of transport and the importance of domestic and international tourism. | |
| 7 | ALLIED – I: HISTORY OF INDIA (1858 – 1947 A.D.) | AH112 | • To focus on the socio-economic changes and development of administration during the British Rule. <br> • To understand the emergence of the National Movement in India. <br> • To study the significance of the Home Rule Movement and Non-Cooperation Movement. <br> • To appraise the different phases of National Movement and Constitutional advancement. <br> • To highlight the factors that led to the partition of India. | • Assess the socio-economic and administrative impact during the British Rule <br> • Recall the concept of nationalism and causes for the national awakening. <br> • Discuss the role of Annie Besant and Gandhian in the freedom movement. <br> • Summarize the development of representative institutions with special reference to reservation. <br> • Explain the impact of partition of India. | **national developmental needs** |
| 8 | ALLIED-II: HISTORY OF INDIA (1947-2014 A.D) | AH212 | • To create awareness on the challenges of Independent India during the tenure of | • Examine the challenges of free India in Constitution making and socio-economic | **national developmental needs** |

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| | | | Jawaharlal Nehru.<br>• To study the administrative initiatives of Lal Bahadur Shastri and Indira Gandhi.<br>• To highlight the factors that led to the emergency and its impact for the rise of Janata Party.<br>• To understand the factors for the introduction of new economic policy since Rajiv Gandhi.<br>• To study the evolution of Indian Foreign Policy and the growth of science and technology. | planning.<br>• Analyze India's relations with foreign powers with special reference to Pakistan.<br>• Assess the factors for the proclamation of emergency and the consolidation of opposition parties under the leadership of Jayaprakash Narayan.<br>• Point out the various dimensions of New Economic Policy and its relative impact in society and economy.<br>• Summarize the evolution of India's foreign policy since 1947. | |
| 9 | HISTORY OF INDIA (1707 - 1857 A.D) | HT304 | • To understand the struggle for supremacy among the European powers.<br>• To study the background for the decline of the native states and establishment of the British rule in India.<br>• To know about the Indian upheavals | • Assess the expansion of European settlements in India.<br>• Review the different policies and methods of the colonial administrators.<br>• Analyze the various battles of British to consolidate their colonial rule in India.<br>• Highlight the | **regional and national developmental needs** |

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| | | | against colonial rule.<br>• To understand the introduction of modern political institutions in the nineteenth century.<br>• To study the nature of social and political changes under the British. | development of the imperial legislature during the British rule.<br>• Reconstruct the native resistance against foreign rule during the 18th and 19th centuries | |
| 10 | ALLIED – III: PRINCIPLES OF PUBLIC ADMINISTRATION | AH309 | • To explain the nature, scope and importance of public administration.<br>• To illustrate the major theories of public administration.<br>• To understand the relative role of chief executive, line, staff and auxiliary agencies.<br>• To study the various methods of recruitment and training. | • Acquire depth knowledge of Pubic Administration.<br>• To receive the knowledge on principles of organizations.<br>• Examine the merits of the chief executive.<br>• To explain the objectives of personnel administration.<br>• To understand the benefit of budgetary system in India | **regional and national developmental needs** |
| 11 | HISTORY OF INDIA (1858 – 1947 A.D) | HT403 | • To highlight the British Administration in India from 1858 – 1947 A.D.<br>• To understand the constitutional growth under the British Rule.<br>• To trace the history of | • Explain the British Administration in India from 1858 – 1947 A.D.<br>• Discuss the constitutional growth under the British Rule<br>• Assess the socio – economic changes and | **regional and national developmental needs** |

| | | | Indian National Movement. <br>• To understand the development of representational and institutions self-governance machanism. <br>• Discuss the events that led to the partitioning British India. | developments during the British Rule. <br>• Evaluate the history of Indian National Movement. <br>• Analyze the contribution of social reformers in British India. | |
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| 12 | CONTEMPORARY HISTORY OF INDIA (1858 – 1947 A.D) | HT404 | • To study the process of Constitution making and integration of native states. <br>• To understand the significance of Indo-Pak war and Tashkent Agreement. <br>• To know about the total revolution and the emergence of Janata party. <br>• To examine the policies and programmes of Congress and National Front Governments. <br>• To study the Coalition governments from 1996 to 2014 and its impact in domestic | • Assess the consolidation of India during the Nehru era. <br>• Summarize the policies of Lal Bahadur Shastri and Indira Gandhi. <br>• Discuss the administration of Janata Government and Re-emergence of Indira Gandhi. <br>• Analyze the introduction of new economic policy and its impact <br>• Examine the consolidation of economic development and foreign policy under the Coalition Governments. | **regional and national developmental needs** |

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| 13 | ALLIED – IV: OUTLINES OF COMPARATIVE GOVERNMENTS | AH409 | • To obtain the basic knowledge of state and different forms of governments.<br>• To study the traditional and modern classification of Constitutions.<br>• To assess the unicameral and bicameral system of legislatures in modern governments.<br>• To provide the main principles of rule of law and administrative law.<br>• To illustrate the role of political parties and pressure groups in democratic system of government. | • To evaluate the Theories of state.<br>• Describe the value of the works of Aristotle's classification of constitution.<br>• Explain the basic concept of the organs of Government.<br>• Examine the influence of the executive and administrative law.<br>• Analyze the role of political parties in India. | **Global and national developmental needs** |
| 14 | ALLIED – IV: OUTLINES OF COMPARATIVE GOVERNMENTS | AH310 | • To obtain the basic knowledge of state and different forms of governments.<br>• To study the traditional and modern classification of Constitutions.<br>• To assess the | • To evaluate the Theories of state.<br>• Describe the value of the works of Aristotle's classification of constitution.<br>• Explain the basic concept of the organs of | **Global and national developmental needs** |

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| | | | unicameral and bicameral system of legislatures in modern governments.<br>• To provide the main principles of rule of law and administrative law.<br>• To illustrate the role of political parties and pressure groups in democratic system of government. | Government.<br>• Examine the influence of the executive and administrative law.<br>• Analyze the role of political parties in India. | |
| 15 | THE CONSTITUTION OF INDIA | HT407 | • To study the evolution of Indian Constitution.<br>• To understand the rights and duties of the citizens of India.<br>• To learn about the basic principles of Indian constitution.<br>• To analyze the working of the union government, state government, and the relationship between the two.<br>• To assess the importance of constitutional bodies like the Election Commission and Public Service | • Students would be able to study the nature and unique features of Indian constitution.<br>• They get familiarized with DPSP and other provisions of the constitution.<br>• They would get an idea about the concepts like fundamental rights and duties, federalism, citizenship etc.<br>• Evaluate the role of the Indian judiciary in interpreting and uploading the Constitution.<br>• Appreciate the role of the constitutional bodies. | **regional and national developmental needs** |

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| 16 | HT506 – HISTORY OF EUROPE – I (1453 – 1789 A.D.) | HT506 | • To study the decline and fall of the Eastern Byzantine Empire.<br>• To discuss about Michelangelo, DA Vinci and Raphael and their contributions.<br>• To understand the key features of the Reformation in 16th and 17th century Europe.<br>• To assess the role of the absolutist rulers in 17th and 18th century Europe.<br>• To discuss the establishment of colonies in Asia. | • Students would have an idea about Renaissance and Reformation.<br>• They get familiarized with the ideas of Martin Luther, Ignatius Loyola and Zwingli.<br>• They learn the impact of Geographical Discoveries in the 15th and 16th centuries.<br>• Students would understand the positive and negative impacts of Industrial Revolution.<br>• Students realize the significance of Geographical Discoveries, Renaissance and Reformations in Christianity. | **Global developmental needs** |
| 17 | HISTORY OF CHINA AND JAPAN (1911 – 1990 A.D.) | HT507 | • To study the history of China during the twentieth century.<br>• To discuss about the revolutions and rebellions that took place in 20th century China. | • The students get basic idea about the history of China and Japan during the 20th century.<br>• They get to know about the revolutions and protests which shaped present day Japan and | **Global developmental needs** |

| | | | | China. | |
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| | | | - To evaluate Japan's role in the world Wars.<br>- To study the Manchurian issue which caused issues between Japan and China<br>- To understand the economic and foreign policies of Japan and China. | - They understand how Japan and China's rivalry became one of the causative factors for the world wars.<br>- They would be able to understand how China and Japan developed into Asia's dominant countries.<br>- Apprehension of Japanese intervention in the second world war and construct japan to foreign and economic policies. | |
| 18 | CONSTITUTION OF INDIA | HT508 | - To study the evolution of Indian Constitution.<br>- To understand the rights and duties of the citizens of India.<br>- To learn about the basic principles of Indian constitution.<br>- To analyze the working of the union government, state government, and the relationship between the two.<br>- To assess the importance of | - Students would be able to study the nature and unique features of Indian constitution.<br>- They get familiarized with DPSP and other provisions of the constitution.<br>- They would get an idea about the concepts like fundamental rights and duties, federalism, citizenship etc.<br>- Evaluate the role of the Indian judiciary in interpreting and | **regional and national developmental needs** |

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| | | | constitutional bodies like the Election Commission and Public Service Commissions. | uploading the Constitution.<br>• Appreciate the role of the constitutional bodies. | |
| 19 | HISTORIOGRAPHY | HT509 | • To study the definition and scope of History.<br>• To understand the technical terms such as Dialectical Materialism, Objectivity in History, Causation in History.<br>• To study the contributions made by Ancient Greco-Roman Historians such as Herodotus, Pliny, Livy, Strabo and Thucydides.<br>• To study the nature of history in relation with other disciplines.<br>• To make the student to understand the various ideas that shaped the work of leading historians. | • Students get familiarized with footnoting, writing references and bibliography.<br>• Students would have knowledge about the Modern Historians like Arnold Toynbee and his contribution to the history of 18th century England.<br>• Students would get an idea about the famous Marxian historians in India such as Romila Thapar, Irfan Habib and Bipin Chandra.<br>• Students would have the opportunity to compare the writings of the traditional historians like Nilakanta Sastri, R G Bhandarkar with that of R S Sharma, Romila Thapar and others.<br>• Students would be able to know about the contribution of noted | **Local and national developmental needs** |

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| | | | | historians of the past with special reference to India. | |
| 20 | MAKERS OF MODERN INDIA | HT510A | • To Study the nature of French Revolution and emergence of Mahatma gandhi<br>• To analyse the unification process of Italy and Germany<br>• To realise the basic reasons, trends and impacts of WWI and peace treaties<br>• To learn the common problems of WWII and its results<br>• To focuss on the cold war and emergence of power blocs and disintegration india | • To Study the nature of French Revolution and emergence of gandhi<br>• To analyse the unification process of Italy and Germany<br>• To realise the basic reasons, trends and impacts of WWI and peace treaties<br>• To learn the common problems of WWII and its results<br>• To focuss on the cold war and emergence of power blocs and disintegration India | **regional and national developmental needs** |
| 21 | HISTORY OF EUROPE – II (1789 – 2000 A.D.) | HT606 | • To Study the nature of French Revolution and emergence of Napolean Bonepartee<br>• To analyse the unification process of Italy and Germany<br>• To realise the basic reasons, trends and impacts of WWI and peace treaties<br>• To learn the common | • To Study the nature of French Revolution and emergence of Napolean Bonepartee<br>• To analyse the unification process of Italy and Germany<br>• To realise the basic reasons, trends and impacts of WWI and peace treaties<br>• To learn the common | **Global developmental needs** |

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| | | | • problems of WWII and its results<br>• To focuss on the cold war and emergence of power blocs and disintegration USSR | • problems of WWII and its results<br>• To focuss on the cold war and emergence of power blocs and disintegration USSR | |
| 22 | HISTORY OF USA (1865 – 1990 A.D.) | HT602 | • | • Analyse the significance of the era of Reconstruction.<br>• Estimate the Progressive movement under the American Presidents.<br>• Elucidate the reasons for the great depression.<br>• Discuss the part played by USA in the World War II.<br>• Examine the various factors that made USA a world power. | **Global Developmental mental needs** |
| 23 | CONTEMPORARY HISTORY OF TAMIL NADU (1947 – 2016 A.D) | HT608 | • To study about the congress government in Tamil Nadu since independence.<br>• To make the students to understand the various schemes of Kamaraj for the development of Tamil Nadu during his Era.<br>• To become aware of the formation of DK and DMK in Tamil | • Discuss the impact of the kula kalvi thittam of Rajaji in Tamil Nadu.<br>• Examine the various schemes of Kamaraj for the development of education in Tamil Nadu.<br>• Review the origin and development of DK and DMK in Tamil Nadu.<br>• The students are familiar with the DMK and | **local, regional developmental needs** |

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| | | | • To study comparatively about the welfare schemes of MGR and J. Jeyalalitha.<br>• To emphasize the various policies and disputes in contemporary Tamil Nadu. | Nadu.<br><br>AIADMK government with its policies and programmes.<br>• Analyze the effect of Coalition Politics on Tamil Nadu. The students are familiar with the Congress, DMK, AIADMK governments that governed TamilNadu with its policies and programmes. | |
| 24 | INDIA AND HER NEIGHBOURS | HT604 | • To study the development of the Indian foreign policy during the period of J Nehru, L B Sastri, Indira Gandhi, Rajiv Gandhi and Narendra Modi.<br>• To critically evaluate the failures of India's Foreign Policy.<br>• To examine India's role as a member in the international organizations like BRICS, ASEAN etc.<br>• To enable the students to understand the core issues on India's foreign policy and the | • Explains the development of the Indian foreign policy during the period of J Nehru, L B Sastri, Indira Gandhi, Rajiv Gandhi and Narendra Modi.<br>• Demonstrate the core issues on India's foreign policy and the challenges faced with its South Asian neighbours<br>• Significance of regional organizations for the promotion of peace and stability.<br>• Importance of India's role as a member in the international organizations like | **national developmental needs** |

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| | | | challenges faced with its South Asian neighbours.<br>• To make them realize the importance of regional organizations for the promotion of peace and stability. | BRICS, ASEAN etc<br>• Evaluate the failures of India's Foreign Policy | |
| 25 | MAIN ELECTIVE – I: HUMAN RIGHTS | HT610A | • To understand the nature and scope of human rights.<br>• To study the role of UNO in human rights developments.<br>• To examine the relationship of NGO and human rights.<br>• To know the role of constitution in the implementation of human rights.<br>• To identify the various Human Rights Violations. | • Explains the historical growth of the idea of human rights.<br>• Demonstrate the efforts of international organizations to safeguard Human Rights.<br>• Significance of NGO in the implementation of human rights.<br>• Importance of constitution in the implementation of human rights.<br>• Interpret the problems of human rights violations and find solution | **Global and national developmental needs** |

**Programme Outcomes at Postgraduate Level**

**Postgraduates will be able to:**

- **PO1:** Demonstrate intense knowledge in their discipline

- **PO2:** Exhibit specialised skills to plan, analyse and draw conclusions related to their respective field of study in theory and in practice

- **PO3:** Develop expertise in their field of study through projects and research activities

- **PO4:** Prepare themselves to incorporate new technologies in their own discipline and demonstrate excellence in their area of specialisation

- **PO5:** Develop social and ethical responsibility in the transfer and management of knowledge


**Programme Specific Outcomes**

On successful completion of this programme, students should be able to:

- **PSO 1:** Acquire fundamental knowledge in problem-solving and in-depth knowledge in computer science to implement solutions using appropriate algorithms of varying complexity.

- **PSO 2:** Apply the knowledge gained during the program to identify, formulate and solve complex real-life problems faced in industries and R&D with an orientation to lifelong learning.

- **PSO 3:** Ability to develop technical skills needed to be an influential academician or an entrepreneur, or in a software concern.

- **PSO 4:** Apply the knowledge of ethical and management principles required to work in a team and lead a team.

- **PSO 5:** Develop software to cater to the needs of the organization, nation and region

| S No | Title of the Paper | Course Code | Course Objectives | Course Outcomes | Relevance |
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| 1 | PRINCIPLES OF COMPILER DESIGN | MCS160T | • To know the basic concepts of compilers.<br>• To explore the phases of a compiler<br>• To know how the source program is executed in the compiler.<br>• To bring in the types of grammar<br>• To develop opcode for the code generation phase. | • On successful completion of this Course, students will be able to<br>• Clarify the role of compiler in programming language.<br>• Describe the lexical analysis, syntax analysis, intermediate code generation, code optimization and code generation.<br>• Demonstrate the need and role of the parser, context free grammars.<br>• Organize the syntax tree for any given expressions.<br>• Compare the different phases of the compiler and its uses.<br>• Develop opcode for the code generation phase. | **global developmental needs** |
| 2 | ADVANCED JAVA PROGRAMMING | MCS161T | • To introduce programming with Applet and AWT.<br>• To give an overview of database access and details for managing information using the JDBC API.<br>• To examine the use of networking and collections.<br>• To learn how to program Servlet and JSP.<br>• To understand the web | • On successful completion of this Course, students will be able to<br>• Discover various techniques used Applet Programming.<br>• Relate Abstract Window Toolkit(AWT) and Events to design Java Applications<br>• Infer CRUD operations of the database using JDBC<br>• Examine collections and | **global developmental needs** |

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| | | | programming concepts in the perspective of Client and Server. | • networking with java.util and java.net packages<br>• Evaluate various server side programming in java.<br>• Produce web based java Applications using Servlet and JSP. | |
| 3 | DESKTOP APPLICATIONS | MCS162T | • To know the differences between desktop and web application.<br>• To construct classes, methods, and accessor and instantiate objects.<br>• To create and manipulate GUI components in C#.<br>• To code solutions and compile C# projects within the .NET framework.<br>• To build own desktop application with Database | • On successful completion of this Course, students will be able to<br>• Recognize the differences between desktop and web applications<br>• Demonstrate the classes, methods, accessor and instantiate objects<br>• Build own desktop application with Database<br>• Analyze the features of Windows Presentation Foundation (WPF)<br>• Find the way to code solutions and compile C# projects within the .NET framework<br>• Create and manipulate GUI components in C#. | **global developmental needs** |
| 4 | OPEN SOURCE TECHNOLOGIES | MCS163T | • To learn designing webpage using HTML & CSS<br>• To understand the concept of Database<br>• To learn Server-side scripting language | • On successful completion of this Course, students will be able to<br>• Clarify the concept of open source technologies and tolls.<br>• Describe the basics of the | **global developmental needs** |

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| | | | • To introduce applications using PHP with MYSQL | Internet like WWW, DNS, web hosting, web publishing, search engines, and protocols.<br>• Solve programs using HTML for web page creation and updating.<br>• Examine the working process of any website in real time.<br>• Compare between client side script and server side script.<br>• Develop websites using HTML, CSS, PHP, MySQL tools. | |
| 5 | ELECTIVE – I: A. WEB SERVICES | MCS164A | • To examine fundamental XML technology<br>• To understand the use of JSON<br>• To gain an understanding about the role of web services in commercial applications<br>• To learn the emerging standard protocols like SOAP, WSDL and UDDI.<br>• To introduce the role of web services in CMS | • On successful completion of this Course, students will be able to<br>• Understand the use of web services in B2C and B2B applications.<br>• Efficiently design principles and application of SOAP and REST based web services.<br>• Identify and select the appropriate framework components in creation of web service solution<br>• Apply OOP principles to creation of web service solutions.<br>• Implement an application that uses multiple web services in a realistic business scenario. | **global developmental needs** |

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| 6 | ELECTIVE-I : B. DATA MINING AND WAREHOUSING | MCS164B | <ul><li>On successful completion of this Course, students will be able to</li><li>Recognize the basic concepts of data mining</li><li>Understand the techniques of data classification using various algorithms</li><li>Characterize the role of data mining techniques in various fields</li><li>Apply various clustering methods for analysis</li><li>Develop skill in selecting the appropriate data mining algorithm for solving practical problems</li><li>Handle the process of data analysis, identifying the problems, and choosing the relevant models and algorithms to apply.</li></ul> | <ul><li>Design collaborating web services according to a specification.</li><li>To understand data mining principles and techniques.</li><li>To expose the students to the concepts of data warehousing architecture and implementation.</li><li>To study the overview of developing areas – web mining, text mining and</li><li>ethical aspects of data mining.</li><li>To identify business applications and trends of data mining.</li><li>To understand the concept of web mining.</li></ul> | **global developmental needs** |
| 7 | ELECTIVE – I: C. DECISION SUPPORT SYSTEM | MCS164C | To introduce the decision making system, models and support<br>• To appraise the general nature and range of decision support and group support     systems<br>• To impart about knowledge based system and advanced intelligent systems | On completion of this course students are able to:<ul><li>Recognize the relationship between business information needs and decision making</li><li>Appraise the general nature and range of decision support systems</li></ul> | **global developmental needs** |

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| | | | • experiments on real life problems using various Decision making methodologies. | • Appraise issues related to the development of DSS<br>• Select appropriate modelling techniques<br>Analyze, design and implement a DSS | |
| 8 | PRACTICAL - I: ADVANCED JAVA PROGRAMMING | MCS165P | • To introduce programming with Applet and AWT.<br>• To give an overview of database access and details for managing information using the JDBC API.<br>• To Examine the use of networking and collections.<br>• To learn how to program Servlet and JSP.<br>• To understand the web programming concepts in the perspective of Client and Server. | • On successful completion of this Course, students will be able to<br>• Experiment Applet Programming using various techniques<br>• Tabulate simple window Abstract Window Toolkit(AWT) and Events to design window based applications<br>• Demonstrate CRUD operations of the database using JDBC<br>• Examine collections and networking with java.util and java.net packages<br>• Develop server side programs in the form of Servlets<br>• Interpret the Java Applications using JSP Tags | **global developmental needs** |
| 9 | PRACTICAL - II: DESKTOP APPLICATIONS | MCS166P | • To show the behavior of the Reflection<br>• To Demonstrate the basic concepts of OOPS<br>• To Apply the ADO.NET to establish the connection with | • On successful completion of this Course, students will be able to<br>• Show the behavior of Reflection<br>• Demonstrate the basic | **global developmental needs** |

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| | | | database<br>• To focus the windows forms controls to create windows applications<br>• To create the desktop applications with database | concepts of OOPS<br>• Apply the ADO.NET to establish the connection with database<br>• Focus the windows forms controls to create windows applications<br>• Find the way to code solutions and compile C# projects with WPF<br>• Create desktop application with database | |
| 10 | PRACTICAL - III: OPEN SOURCE TECHNOLOGIES | MCS167P | • learn designing webpage using HTML & CSS<br>• understand the concept of Database<br>• learn Server-side scripting language<br>• introduce applications using PHP with MYSQL | • On successful completion of this Course, students will be able to<br>• Find the usages of open sources technologies.<br>• Explain the process of website creation to any kind of real time problem.<br>• Solve the problem using HTML, CSS, PHP, MySQL, and JSON.<br>• Examine the methods to develop and design web pages.<br>• Justify the selection of technology for given problem.<br>• Create web pages using HTML, CSS, PHP, MySQL and JSON. | **global developmental needs** |
| 11 | EMPLOYABILITY SKILLS | MCS168S | • To know the basic requirements of the JOB. | • On successful completion of this Course, students will be | **global developmental** |

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| | | | • To know the problem in the process of interview.<br>• Preparation towards taking part in the interview<br>• To know about the communication process<br>• To improve oneself in facing interview | able to<br>• Identify the basic requirements of the Job.<br>• Observe the problem in the process of interview.<br>• Establish the preparation towards taking part in the interview.<br>• Focus and improve the communication process.<br>• Find the ways to improve the body language and self-grooming<br>• Develop the skills to improve oneself in facing interview. | |
| 12 | DISTRIBUTED OPERATING SYSTEMS | MCS260T | • To understand the fundamental concepts of operating systems<br>• To understand the need for distributed systems.<br>• To get acquainted with the design principles of distributed operating systems.<br>• To explore the concept of synchronization<br>• To handle the process in distributed environment | • On successful completion of this Course, students will be able to<br>• Find the meaning of distributed operating system with examples.<br>• Summarize various types of distributed computing models.<br>• Illustrate the process, message, packet, IPC.<br>• Discussion on two types of communication methods like synchronous and asynchronous.<br>• Summarize centralized system and Distributed systems.<br>• Describe the various | **global developmental needs** |

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| | | | | communication methods like synchronous communication and asynchronous communication. | |
| 13 | ENTERPRISE JAVA PROGRAMMING | MCS261T | • To expose the knowledge of MVC and Java server faces<br>• To provide the knowledge and skills required to develop web applications using the MVC framework provided by Apache Struts<br>• To develop Enterprise web application using EJB.<br>• To understand and implement the object-relation mapping using Hibernate<br>• To explore the knowledge of Aspect Oriented Programming using Spring and Spring MVC. | • On successful completion of this Course, students will be able to<br>• Associate JSP and Servlet using MVC approach.<br>• Classify the ways of using JSF Tags(Core tags, HTML Tags)<br>• Reproduce the web applications using the MVC framework provided by Apache Struts<br>• Appraise the AOP(Aspect Oriented Programming) using Spring and Spring MVC<br>• Prepare Enterprise web application using EJB<br>• Integrate the Object-Relation Mapping technique with java using Hibernate | **global developmental needs** |
| 14 | WEB APPLICATIONS | MCS262T | • To understand the difference between desktop and dynamic web applications.<br>• To understand the ASP.NET web application execution model.<br>• To create and modify multi-page Web Form applications and Web Services | • On successful completion of this Course, students will be able to<br>• Discover the differences between static and dynamic web application.<br>• Demonstrate the ASP.NET web application execution model. | **global developmental needs** |

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| | | | • To demonstrate features like flow control, data access and data binding<br>• To validate forms with in an application. | • Build own application by using the features like data access and data binding<br>• Analyze and implement security mechanism in web applications<br>• Find the way to code solutions and compile ASP.NET projects within the .NET framework<br>• Create and Validate web applications | |
| 15 | PROGRAMMING IN PYTHON | MCS263T | • To know the basics of algorithmic problem solving<br>• To read and write simple Python programs.<br>• To develop Python programs with conditionals and loops.<br>• To define Python functions and call them.<br>• To use Python data structures – lists, tuples, dictionaries.<br>• To do input/output with files in Python. | • On successful completion of the course students will be able to:<br>• Identify the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements<br>• Express proficiency in the handling of strings and functions.<br>• Interpret the methods to create and manipulate Python programs by utilizing the data structures like lists, dictionaries, tuples and sets<br>• Explore the commonly used operations involving file systems and modules<br>• Resolve the concepts like exception handling, data base | **global developmental needs** |

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| 16 | ELECTIVE-II: A. OBJECT ORIENTED ANALYSIS AND DESIGN | MCS264A | • To understand the fundamental concepts of UML diagrams.<br>• To draw diagrams with project documentation.<br>• To analyze the requirements given by stake holder<br>• To design the project with examples.<br>• To understand the Software Development Process | • On successful completion of this Course, students will be able to<br>• Find the meaning of object oriented analysis and design.<br>• Explain the stages of software development life cycle.<br>• Solve problems using simple UML diagram.<br>• Examine various class model, state model and interaction models.<br>• Justify the differences between object oriented design and implementation.<br>• Create UML diagrams for software development process. | **global developmental needs** |
| 17 | ELECTIVE II: B. SOFTWARE TESTING AND QUALITY ASSURANCE | MCS264B | • To introduce various approaches, techniques, technologies, and methodologies used in software testing and quality assurance.<br>• To understand the role of testing in applications<br>• To learn to design the test cases<br>• To know the different levels of testing<br>• To study the state-of-the-art of software testing and quality | • On successful completion of this Course, students will be able to<br>• Understand the key concepts and principles of software testing<br>• Specify and perform the activities involved in a testing process<br>• Understand the role of ethics in the software engineering and | **global developmental needs** |

(row 15 continued)
- and GUI programming.
- Create Python programs for solving real world complex problems

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| | | | assurance. | the responsibilities of software engineers in general<br>• Evaluate the work of peers constructively by following proven methods of peer-review, and by using the principles of research ethics<br>• Conduct independent research in software testing and quality assurance and apply that knowledge in their future research and practice<br>• Application of software testing techniques in commercial environments | |
| 18 | ELECTIVE-II: C. SOFTWARE PROJECT MANAGEMENT | MCS264C | • To provide sound knowledge in Project Management.<br>• To understand the importance of requirement gathering<br>• To explore different models in Software Development<br>• To know the workflow of a Project<br>• To identify various actors in the activity<br>• | Upon completion of the course students will be able to:<br>• Understand the activities during the project scheduling of any software application.<br>• Learn the risk management activities and the resource allocation for the projects.<br>• Apply the software estimation and recent quality standards for evaluation of the software Projects.<br>• Acquire knowledge and skills needed for the construction of highly reliable software project.<br>• Able to create reliable, | **global developmental needs** |

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| | | | | replicable cost estimation that links to the requirements of project planning and managing. | |
| 19 | PRACTICAL - IV: ENTERPRISE JAVA PROGRAMMING | MCS265P | • To expose the knowledge of MVC and Java server faces<br>• To provide the knowledge and skills required to develop web applications using the MVC framework provided by Apache Struts<br>• To Develop Enterprise web application using EJB.<br>• To understand and implement the object-relation mapping using Hibernate<br>• To explore the knowledge of Aspect Oriented Programming using Spring and Spring MVC. | • On successful completion of this Course, students will be able to<br>• Connect JSP and Servlet using MVC approach.<br>• Classify the ways of using JSF Tags(Core tags, HTML Tags)<br>• Reframe the web applications using the MVC framework provided by Apache Struts<br>• Prepare Enterprise web application using EJB<br>• Integrate the Object-Relation Mapping technique with java using Hibernate<br>• Evaluate the AOP(Aspect Oriented Programming) using Spring and Spring MVC | **global developmental needs** |
| 20 | PRACTICAL - V: WEB APPLICATIONS | MCS266P | • To demonstration of Web Configuration file<br>• To apply the web control classes<br>• To develop the component programming<br>• To create a secured web application with validation<br>• To apply the component programming | • On successful completion of this Course, students will be able to<br>• Show the behavior of HTML Control Classes, Control Events, Container and Input Control Classes<br>• Demonstrate the implementation of Web | **global developmental needs** |

| | | | | Configuration file | |
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| | | | | • Apply the Web control classes and control tags | |
| | | | | • Focus on the component programming | |
| | | | | • Find the way to create and code the component programming, Custom and User Controls | |
| | | | | • Create a secured web application with validation controls and database | |
| 21 | PRACTICAL - VI: PROGRAMMING IN PYTHON | MCS267P | • To know the basics of algorithmic problem solving<br>• To read and write simple Python programs.<br>• To develop Python programs with conditionals and loops.<br>• To define Python functions and call them.<br>• To use Python data structures – lists, tuples, dictionaries.<br>• To do input/output with files in Python. | • On successful completion of the course students will be able to:<br>• Identify the features and steps to execute Python programs.<br>• Implement Python programs with conditionals and loops.<br>• Use functions for structuring Python programs.<br>• Represent compound data using Python lists, tuples, and dictionaries.<br>• Read and write data from/to files in Python.<br>• Develop user interface applications | **global developmental needs** |
| 22 | TECHNICAL APTITUDE | MCS268S | • To impart knowledge on various basic principles involved in Computer science.<br>• To prepare the students for | • On successful completion of this Course, students will be able to<br>• Identify the important concepts | **local developmental** |

| | | | facing the technical interview questions<br>• To prepare the students for the placement | and techniques in core subjects.<br>• Discuss the principles involved computer science subjects.<br>• Infer confident about the technical questions<br>• Analyze their skills by attending the quiz.<br>• Grade the students to build their career by studying the core concepts in Computer Subjects<br>• Evaluate the students' technical knowledge based on the performance of their quiz. | **needs** |
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| 23 | SOFTWARE PROJECT I & II | MCS466J | • To examine fundamental XML technology<br>• To understand the use of JSON<br>• To gain an understanding about the role of web services in commercial applications<br>• To learn the emerging standard protocols like SOAP, WSDL and UDDI.<br>• To introduce the role of web services in CMS | • On completion of the course, students should be able to<br>• CO1: Identifying the ability to work in one or more significant application domains<br>• CO2: Understanding of software requirements and the SRS documents<br>• CO3: Practice the role of professional ethics in successful software development<br>• CO4: Analyze and apply information technology principles and practices to real-world solutions<br>• CO5: Evaluate,  the ability to | **local developmental needs** |

| | | | | develop, maintain an evaluate large scale software systems<br>• CO6: Demonstrate an ability to use the techniques and tools | |
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| 24 | HUMAN RIGHTS | VE1003 | • To strengthen respect for human rights and fundamental freedoms,<br>• To value human dignity and develop individual self-respect and respect for others<br>• To develop attitudes and behaviors that will lead to respect for the rights of others.<br>• To promote respect, understanding and appreciation of diversity.<br>• To empower people towards more active citizenship.<br>• To ensure genuine mime gender equality and equal opportunities for women and men. | • On completion of the course, students should be able to<br>• CO1: Understand the historical growth of the idea of human rights.<br>• CO2: Summarize an understanding of what human rights.<br>• CO3: Identify and analyze who is responsible for upholding human rights<br>• CO4: Distinguish the meaning and significance of the Universal Declaration of Human Rights<br>• CO5: Evaluate the concepts and ideas of Human Rights.<br>• CO6: Adapt and apply the concepts of human rights to their own lives | **national developmental needs** |
| 25 | INTERNET OF THINGS | MCS360T | • To introduce the IoT and its baseline technologies.<br>• To explore the IOT and M2M and its Connectivity technologies.<br>• To understand the contribution of WSN and other networks towards IOT. | • On successful completion of this Course, students will be able to<br>• Recall the basics of IoT and its baseline technologies.<br>• Classify IOT and M2M and its Connectivity technologies<br>• Prepare a simple IOT | **global developmental needs** |

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| | | | • To implement the IOT applications using Arduino and Raspberry Pi.<br>• To know the importance of SDN, Sensor cloud and Fog computing. | applications using sensors and Arduino board.<br>• Integrate various Sensors with Arduino and raspberry Pi<br>• Evaluate and adapt the importance of SDN, Sensor cloud and Fog computing. | |
| 26 | CLOUD COMPUTING | MCS361T | • To introduce the broad perceptive of cloud architecture and model.<br>• To understand the concept of Virtualization and design of cloud Services<br>• To be familiar with the lead players in cloud.<br>• To understand the features of cloud simulator<br>• To apply different cloud programming model as per need.<br>• To learn to design the trusted cloud Computing system<br>• | Upon Completion of the syllabus the students are able to know:<br>• To know the broad perceptive of cloud architecture and model.<br>• Familiar with Virtualization and design of cloud Services<br>• understand the features of cloud services<br>• To apply different cloud programming model as per need.<br>• To design the trusted cloud Computing system | **global developmental needs** |
| 27 | DESIGN AND ANALYSIS OF ALGORITHMS | MCS362T | • On successful completion of this Course, students will be able to<br>• Prove the correctness and analyze the running time of the basic algorithms for those classic problems<br>• Review the basic knowledge of algorithm design and its implementation.<br>• Assess the key techniques of | • To prove the correctness and analyze the running time of the basic algorithms for those classic problems.<br>• To understand the basic knowledge of algorithm design and its implementation.<br>• To learn the key techniques of Divide-and-Conquer and Greedy Method. | **global developmental needs** |

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| | | | <ul><li>Divide-and-Conquer and Greedy Method.</li><li>Examine the various problems solved by Dynamic Programming and its algorithms</li><li>Adapt the Backtracking method to solve N-Queen, Graph coloring sum of subsets problems.</li><li>Interpret various Branch and Bound techniques for designing the algorithms .</li></ul> | <ul><li>To recognize the concept of Dynamic Programming and its algorithms</li><li>To familiarize with Backtracking algorithms.</li><li>To understand Branch and Bound techniques for designing and analyzing algorithms.</li></ul> | |
| 28 | MOBILE APPLICATIONS | MCS363T | <ul><li>To know the basis of Android application and development environment</li><li>To able to develop simple and professional application</li><li>To know the different controls in Android</li><li>To impart knowledge about handling pictures and menus</li><li>To get ready for the job opportunity in mobile application development.</li></ul> | <ul><li>On successful completion of this Course, students will be able to</li><li>Understand about the mobile application development environment</li><li>Interpret the working process of Activities and Fragments</li><li>Use the techniques in Mobile Applications</li><li>Analyze and design a real world problem for implementation and understand the dynamic behavior of a system.</li><li>Compare the Native apps with Hybrid apps</li><li>Develop interface and design and create the job opportunity in mobile application</li></ul> | **global developmental needs** |

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| 29 | ELECTIVE - III: A. SEMANTIC WEB | MCS364A | • To learn the fundamentals of semantic web and to conceptualize and depict ontology for semantic web.<br>• To make a study of languages for semantic web.<br>• To learn about the ontology learning algorithms and to utilize in the development of an application.<br>• To know the fundamental concepts of ontology management.<br>• To learn the applications related to semantic web. | • On successful completion of this Course, students will be able to.<br>• Identify the ontology for a given domain.<br>• Understand and develop an application using ontology languages and tools.<br>• Discover the concepts of semantic web.<br>• Analyze and use ontology related tools and technologies for application creation.<br>• Evaluate the design and develop applications using semantic web.<br>• Generalize the standards related to semantic web. | **global developmental needs** |
| 30 | ELECTIVE – III: B. SECURITY SYSTEMS | MCS364B | • To introduce the classical encryption techniques<br>• To understand the concept of network security practices<br>• To know about system security and web security<br>• To impart knowledge on wireless network security<br>• To explore the types of cyber crimes | Upon completion of the Syllabus the students are able:<br>• To know the classical encryption techniques<br>• To demonstrate the security practices<br>• To remember bout system security and web security<br>• To have knowledge on wireless network security<br>• To explore the types of cyber crimes | **global developmental needs** |

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| 31 | ELECTIVE – III: C. ARTIFICIAL INTELLIGENCE | MCS364C | • To provide a strong foundation of fundamental concepts in Artificial Intelligence<br>• To provide a basic exposition to the goals and methods of Artificial Intelligence<br>• To enable the student to apply these techniques in applications which involve perception, reasoning and learning | After completion of the syllabus the student will be able to:<br>• Understand the various searching techniques, constraint satisfaction problem and example problems- game playing techniques.<br>• Apply these techniques in applications which involve perception, reasoning and learning.<br>• Explain the role of agents and how it is related to environment and the way of evaluating it and how agents can act by establishing goals.<br>• Acquire the knowledge of real world Knowledge representation.<br>• Analyze and design a real world problem for implementation and understand the dynamic behavior of a system.<br>Use different machine learning techniques to design AI machine and enveloping applications for real world problems | **global developmental needs** |

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| 32 | PRACTICAL - VII: DESIGN AND ANALYSIS OF ALGORITHMS | MCS365P | • To prove the correctness and analyze the running time of the basic algorithms for those classic problems.<br>• To understand the basic knowledge of algorithm design and its implementation.<br>• To learn the key techniques of Divide-and-Conquer and Greedy Method.<br>• To recognize the concept of Dynamic Programming and its algorithms<br>• To familiarize with Backtracking algorithms.<br>• To understand Branch and Bound techniques for designing and analyzing algorithms. | • On successful completion of this Course, students will be able to<br>• Prove the correctness and analyze the running time of the basic algorithms for those classic problems<br>• Review the basic knowledge of algorithm design and its implementation.<br>• Assess the key techniques of Divide-and-Conquer and Greedy Method.<br>• Examine the various problems solved by Dynamic Programming and its algorithms<br>• Adapt the Backtracking method to solve N-Queen, Graph coloring sum of subsets problems.<br>• Interpret various Branch and Bound techniques for designing the algorithms . | **global developmental needs** |
| 33 | PRACTICAL - VIII: MOBILE APPLICATIONS | MCS366P | • To understand the mobile application development<br>• To interpret the working process of Activities and Fragments<br>• To Develop mobile application using Telephony<br>• To create a mobile application using SMS manager | • On successful completion of this Course, students will be able to<br>• Understand about the mobile application development environment<br>• Interpret the working process of Activities and Fragments | **global developmental needs** |

| | | | | • To develop the mobile application | • Use the techniques in Mobile Applications<br>• Analyze and design a real world problem for implementation and understand the dynamic behavior of a system.<br>• Compare the Native apps with Hybrid apps<br>• Develop interface and design and create the job opportunity in mobile application development | |
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| 34 | BIG DATA ANALYTICS | MCS460T | | • To understand the needs for Big Data and its environments.<br>• To learn the basic requirements of Big Data Technologies.<br>• To expose the knowledge of MapReduce programming framework (Hadoop).<br>• To be familiar with NoSQL DB's Cassandra and MongoDB<br>• To understand Hive and Pig technologies for analyzing the Big Data. | • On successful completion of this Course, students will be able to<br>• Recall various types of digital data and big data<br>• Review of various Big data analytics and its Technologies<br>• Incorporate the knowledge of various NoSQL databases.<br>• Demonstrate the NoSQL databases such as MongoDB and Cassendra<br>• Design & assess the Big data queries using Hive and Pig | **global developmental needs** |
| 35 | DATA SCIENCE WITH PYTHON | MCS461T | | • To know the fundamental algorithmic ideas to process data.<br>• To learn to apply hypotheses and data into actionable predictions. | • On successful completion of this Course, students will be able to<br>• Review the basic understanding of NumPy and | **global developmental needs** |

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| | | | • To document and transfer the results and effectively communicate the findings using visualization techniques.<br>• To employ the Map reduce technique | Pandas<br>• Illustrate to use conditional loops and list by python<br>• Visualizing the results of analytics effectively<br>• Solve a simple application for data loading, Storing the files with various file formats.<br>• Design & assess the Visualization through Matplotlib<br>• Prepare to perform pre-processing of data using Numpy and Pandas. | |
| 36 | CRYPTOGRAPHY AND NETWORK SECURITY | MCS462T | • To introduce Classical Encryption techniques<br>• To understand the principles of encryption algorithms<br>• To have a detailed knowledge about authentication, hash functions and application level security mechanisms.<br>• To introduce Network Security Concepts<br>• To understand the System level Security | • On successful completion of this Course, students will be able to<br>• Introduce Classical Encryption techniques<br>• Detailed knowledge about authentication, hash functions and application level security mechanisms<br>• Introduce Network Security Concepts<br>• Understand the System level Security | **global developmental needs** |
| 37 | ELECTIVE – IV: A. MACHINE LEARNING | MCS463A | To introduce the concepts like<br>• conceptualization and summarization of big data and machine learning<br>• Introduction to the course, recap | Upon completion of this course, students will be able to:<br>• design and implement machine learning solutions to classification, regression, and | **global developmental needs** |

| | | | | clustering problems; | |
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| | | | of linear algebra and probability theory basics.<br>• Bayesian Classification: Naive Bayes, Parameter Estimation (ML, MAP), Sequential Pattern Classification.<br>• Non-parametric Methods: k-Nearest Neighbours<br>• Discriminative Learning models: Logistic Regression, Perceptrons, Artificial Neural Networks, Support Vector Machines. | • evaluate and interpret the results of the algorithms.<br>• Ability to select and implement machine learning techniques and computing environment that are suitable for the applications under consideration.<br>• Ability to solve problems associated with batch learning and online learning, and the big data characteristics such as high dimensionality, dynamically growing data and in particular scalability issues.<br>• Ability to understand and apply scaling up machine learning techniques and associated computing techniques and technologies.<br>• Ability to recognize and implement various ways of selecting suitable model parameters for different machine learning techniques. | |
| 38 | ELECTIVE – IV: B. BLOCKCHAIN TECHNOLOGY | MCS463B | • Be able to explain what is blockchain<br>• Be able to explain why we need blockchain. What is the real world problem(s) that blockchain is trying to solve | Upon completion of this course, students will be able to:<br>• Basic knowledge of Distributed Ledger Technologies and how they work. | **global developmental needs** |

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| | | | • Understand and describe how blockchain works<br>• Explain the underlying technology of transactions, blocks, proof-of-work, and consensus building<br>• How does blockchain exist in the public domain (decentralized, distributed) yet maintain transparency, privacy, anonymity, security, immutability, history<br>• How is blockchain incentivized without any central controlling or trusted agency | • Basic knowledge of Bitcoin, Ethereum and Hyperledger fabric.<br>• Understandings of current trends of Blockchain, and ability to imagine its use cases and future.<br>• | |
| 39 | ELECTIVE – IV: C. COGNITIVE COMPUTING | MCS463C | • To learn the basics of Cognitive Science with focus on acquisition, representation, and use of knowledge by individual minds, brains, and machines<br>• To study the mind and intelligence, embracing psychology, artificial intelligence, neuroscience and linguistics<br>• To understand the role of neuro science in the cognitive field | At the conclusion of the course, students should be able to:<br>• Explain and analyze the major concepts, philosophical and theoretical perspectives, empirical findings, and historical trends in cognitive science, related to cultural diversity and living in a global community.<br>• Use cognitive science knowledge base to create their own methods for answering novel questions of either a theoretical or applied nature.<br>• Critically evaluate the work of others in the same domain | **global developmental needs** |

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| | | | | • Be proficient with basic cognitive science research methods, including both theory-driven.<br>• Applied research design, data collection, data analysis, and data interpretation. | |
| 40 | PRACTICAL – IX: DATASCIENCE WITH PYTHON | MCS464P | • To know the fundamental algorithmic ideas to process data.<br>• To learn to apply hypotheses and data into actionable predictions.<br>• To document and transfer the results and effectively communicate the findings using visualization techniques.<br>• To employ the Map reduce technique | • On successful completion of this Course, students will be able to<br>• Review the basic understanding of NumPy and Pandas<br>• Illustrate to use conditional loops and list by python<br>• Visualizing the results of analytics effectively<br>• Solve a simple application for data loading, Storing the files with various file formats.<br>• Design & assess the Visualization through Matplotlib<br>• Prepare to perform pre-processing of data using Numpy and Pandas. | **global developmental needs** |
| 41 | PRACTICAL – X: CRYPTOGRAPHY AND NETWORK SECURITY | MCS465P | • To introduce Classical Encryption techniques<br>• To understand the principles of encryption algorithms<br>• To have a detailed knowledge about authentication, hash | • On successful completion of this Course, students will be able to<br>• Introduce Classical Encryption techniques<br>• Detailed knowledge about | **global developmental needs** |

| | | | functions and application level security mechanisms. | authentication, hash functions and application level security mechanisms | |
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| | | | • To introduce Network Security Concepts<br>• To understand the System level Security | • Introduce Network Security Concepts<br>• Understand the System level Security | |
| 42 | SOFTWARE PROJECT I & II | MCS466J | • To examine fundamental XML technology<br>• To understand the use of JSON<br>• To gain an understanding about the role of web services in commercial applications<br>• To learn the emerging standard protocols like SOAP, WSDL and UDDI.<br>• To introduce the role of web services in CMS | • On completion of the course, students should be able to<br>• CO1: Identifying the ability to work in one or more significant application domains<br>• CO2: Understanding of software requirements and the SRS documents<br>• CO3: Practice the role of professional ethics in successful software development<br>• CO4: Analyze and apply information technology principles and practices to real-world solutions<br>• CO5: Evaluate, the ability to develop, maintain an evaluate large scale software systems<br>• CO6: Demonstrate an ability to use the techniques and tools | **Local developmental needs** |
| 43 | HUMAN RIGHTS | VE1003 | • To strengthen respect for human rights and fundamental freedoms,<br>• To value human dignity and | • On completion of the course, students should be able to<br>• CO1: Understand the historical growth of the idea of human | **national developmental needs** |

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| | | | • develop individual self-respect and respect for others<br>• To develop attitudes and behaviors that will lead to respect for the rights of others.<br>• To promote respect, understanding and appreciation of diversity.<br>• To empower people towards more active citizenship.<br>• To ensure genuine mime gender equality and equal opportunities for women and men. | rights.<br>• CO2: Summarize an understanding of what human rights.<br>• CO3: Identify and analyze who is responsible for upholding human rights<br>• CO4: Distinguish the meaning and significance of the Universal Declaration of Human Rights<br>• CO5: Evaluate the concepts and ideas of Human Rights.<br>• CO6: Adapt and apply the concepts of human rights to their own lives | |
| 44 | RESEARCH INVESTIGATION | MCS467S | • To enable the students to choose an area of specialization.<br>• To help the students to focus on current research in computer science.<br>• To understand the research areas by collecting and reading research papers, analysing qualitative and quantitative aspects by a survey or implementation. | • On completion of the course, students should be able to<br>• CO1: Identify the research ethics.<br>• CO2: Understand the research problem and research process.<br>• CO3: Develop skills in qualitative and quantitative data analysis and presentation<br>• CO4: Evaluate a well-structured research paper and scientific presentations<br>• CO5: Assess the adequate knowledge of research<br>• CO6: Demonstrate the ability to choose methods appropriate | **national developmental needs** |

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