

E.G.S. PILLAY ENGINEERING COLLEGE

(Autonomous)

Approved by AICTE, New Delhi | Affiliated to Anna University, Chennai

Accredited by NAAC with 'A' Grade | Accredited by NBA

NAGAPATTINAM – 611002



B.TECH. INFORMATION TECHNOLOGY

R-2019

THIRD YEAR

SEMESTER V									
Course Code	Course Name	L	T	P	C	Maximum Marks			Category
						CA	ES	Total	
Theory Course									
1902IT501	Object Oriented Analysis and Design	3	0	0	3	40	60	100	PC
1902IT502	Web Programming	3	0	0	3	40	60	100	PC
1902IT503	Security in Computing	3	0	0	3	40	60	100	PC
1902IT504	Internet of Things	3	2	0	4	40	60	100	PC
1903IT001	Software Testing Methods and Tools	3	0	0	3	40	60	100	PE
1901MGX01	Total Quality Management	3	0	0	3	40	60	100	HSSE
Laboratory Course									
1902IT551	Web Programming Lab	0	0	2	1	50	50	100	PC
1904IT551	Case Tools (Mini Project I)	0	0	2	1	50	50	100	EEC
1904GE551	Life Skills: Aptitude I	0	0	2	1	100	-	100	EEC
1904IT552	Startup Opportunities for IT Engineers	0	0	2	1	100	-	100	EEC
Audit Course									
1902MCX03	Essence of Indian Traditional Knowledge	2	0	0	0	100	-	100	-
Total		20	2	8	23	640	460	1100	-

1902IT501	OBJECT ORIENTED ANALYSIS AND DESIGN			L	T	P	C
				3	0	0	3
AIM: To study various object oriented analysis and design method using CASE tools							
PREREQUISITE: Software Engineering and Project Management							
COURSE OBJECTIVES:							
<ol style="list-style-type: none"> 1. Learn the basics of OO analysis and design skills 2. Learn the UML design diagrams 3. Learn to map design to code 4. Be exposed to the various testing techniques. 							
UNIT I	UML DIAGRAMS						9 Hours
Introduction to OOAD – Unified Process - UML diagrams – Use Case – Class Diagrams– Interaction Diagrams – State Diagrams – Activity Diagrams – Package, component and Deployment Diagrams							
UNIT II	DESIGN PATTERNS						9 Hours
GRASP: Designing objects with responsibilities – Creator – Information expert – Low Coupling – High Cohesion – Controller - Design Patterns – creational - factory method - structural – Bridge – Adapter - behavioral – Strategy – observer							
UNIT III	CASE STUDY						9 Hours
Case study – the Next Gen POS system, Inception -Use case Modeling - Relating Use cases –include, extend and generalization - Elaboration - Domain Models - Finding conceptual classes and description classes – Associations – Attributes – Domain model refinement – Finding conceptual class Hierarchies - Aggregation and Composition							
UNIT IV	APPLYING DESIGN PATTERNS						9 Hours
System sequence diagrams - Relationship between sequence diagrams and use cases Logical architecture and UML package diagram – Logical architecture refinement - UML class diagrams – UML interaction diagrams - Applying GoF design patterns							
UNIT V	CODING AND TESTING						9 Hours
Mapping design to code – Testing: Issues in OO Testing – Class Testing – OO Integration Testing –GUI Testing – OO System Testing							
						TOTAL:	45 Hours
FURTHER READING: Software Development, Software Design							
COURSE OUTCOMES							
At the end of this course, students will able to, CO1: Design and implement projects using OO concepts CO2: Use the UML analysis and design diagrams CO3: Apply appropriate design patterns CO4: Create code from design CO5: Compare and contrast various testing techniques							
REFERENCES:							
1. Craig Larman, "Applying UML and Patterns: An Introduction to Object-Oriented Analysis and Design and Iterative Development", Third Edition, Pearson Education, 2016.							
2. Simon Bennett, Steve Mc Robb and Ray Farmer, "Object Oriented Systems Analysis and Design Using UML", Fourth Edition, Mc-Graw Hill Education, 2012.							
3. Erich Gamma, a n d Richard Helm, Ralph Johnson, John Vlissides, "Design patterns:Elements of Reusable Object-Oriented Software", Addison-Wesley, 2012.							
4. Martin Fowler, "UML Distilled: A Brief Guide to the Standard Object Modeling Language", Third edition, AddisonWesley, 2013.							
5. Paul C. Jorgensen, "Software Testing:- A Craftsman’s Approach", Third Edition, Auerbach Publications, Taylor and Francis Group, 2010.							
6. http://nptel.ac.in/							

1902IT502	WEB PROGRAMMING			L	T	P	C	
				3	0	0	3	
AIM: The main objective of this course is used to introduce the concepts of Web Essentials and various web services								
PREREQUISITE: Programming in Java Programming, Database Management Systems.								
COURSE OBJECTIVES:								
1) To understand the concept of client / server programming 2) To apply web programming languages for developing web applications 3) To know the unique features of scripting languages								
UNIT I	WEB ESSENTIALS						9 Hours	
Internet – Web clients – Web servers – Markup languages – Introduction to XHTML-Editing XHTML-Headings-Linking –Tables-Images-Forms-Internal linking – Frames - Lists- Cascading Style Sheets (CSS): Features-Style rule cascading and inheritance - Text properties –CSS box model.								
UNIT II	CLIENT SIDE PROGRAMMING						12 Hours	
Client side vs. Server side programming languages - Introduction to java script –Control statements I - Control statements II - Functions- Objects – Arrays – PHP Programming								
UNIT III	SERVER SIDE PROGRAMMING						12 Hours	
Java servlet: Architecture – Servlet life cycle -Simple programs using java servlet– Parameter data – Sessions – Cookies – Other servlet capabilities –Data storage –Servlet and concurrency- JDBC- Connecting a java servlet program to a database								
UNIT IV	XML AND WEB SERVICES						12 Hours	
XML Namespaces-DTD and XML schema-XML parsers: DOM vs. SAX-XSLT – Xquery - XPath- JSP - Running JSP applications – Java beans classes and JSP - Web services concepts - Web services for clients – WSDL – Representing data types: XML schema – SOAP - J2EE								
						TOTAL:	45 Hours	
FURTHER READING: Software Development, Mobile Application Development								
COURSE OUTCOMES								
At the end of this course, students will able to, CO1: Design web pages using HTML and CSS CO2: Develop web pages using java script CO3: Develop server side programming techniques to solve real time application CO4: Apply database concept to create interactive web pages CO5: Apply JSP concepts to solve real time applications CO6: Understand the basic concept of web services								
REFERENCES:								
1. Jeffrey C Jackson, Web Technology – A computer Science perspective, Person Education, New Delhi, 2016.								
2. Frank. P. Coyle, XML, Web Services and the Data Revolution, Addison-Wesley Professional, 2012.								
3. Chris Bates, Web Programming – Building Internet Applications, Wiley India, 2013.								
4. Deitel, Deitel and Neito, Internet and World wide web – How to program, Pearson education, New Delhi, 2016.								
5. Gopalan. N.P, Web Technology A Developer Perspectives, PHI, 2012								
6. H.M.Deitel, P.J.Deitel, T.R.Nieto, T.M.Lin, XML How to Program, Pearson Education,2012								
7. Ramesh Nagappan, Robert Skoczylas and Rima Patel Sriganesh, Developing Java Web Services, Wiley Publishing Inc., 2011.								
8. Steve Graham and Doug Davis, Building Web services with Java, Pearson Education 2011								
9. http://nptel.ac.in/								
10. http://sololearners.com/								
11. http://tutorialpoint.org								

1902IT551	WEB PROGRAMMING LAB			L	T	P	C
			0	0	2	1	
PREREQUISITE: Programming in Java Programming, Database Management Systems.							
LIST OF EXPERIMENTS							
<ol style="list-style-type: none"> 1. Write a html program for Creation of web site with forms, frames, links, tables etc 2. Design a web site using HTML and DHTML. Use Basic text Formatting, Images, 3. Create a script that asks the user for a name, then greets the user with "Hello" and the user name on the page 4. Create a script that collects numbers from a page and then adds them up and prints them to a blank field on the page. 5. Create a script that prompts the user for a number and then counts from 1 to that number displaying only the odd numbers. 6. Create a script that will check the field in Assignment 1 for data and alert the user if it is blank. This script should run from a button. 7. Using CSS for creating web sites 8. Creating simple application to access data base using JDBC Formatting HTML with CSS. 9. Program for manipulating Databases and SQL. 10. Program using PHP database functions. 11. Write a web application that functions as a simple hand calculator, but also keeps a "paper trail" of all your previous work 12. Install Tomcat and use JSP and link it with any of the assignments above 13. Reading and Writing the files using .Net 14. Write a program to implement web service for calculator application 15. Implement RMI concept for building any remote method of your choice. 							
Requirements: Web Browser, JDK1.5, Netbeans IDE or Eclipse or Equivalent							
TOTAL:						30 Hours	

1902IT503	SECURITY IN COMPUTING			L	T	P	C
				3	0	0	3
AIM: To study various cryptography techniques for enable security and study various network security protocols							
PREREQUISITES: Computer Networks, Java Programming							
COURSE OBJECTIVES:							
<ol style="list-style-type: none"> 1. Understand the concepts of public key encryption and number theory 2. Understand authentication and hash functions. 3. Know the network security tools and applications. 4. Understand the system level security used. 							
UNIT I	INTRODUCTION						9 Hours
Motivating examples– Basic concepts: confidentiality, integrity, availability, security policies, security mechanisms, assurance –Basic Cryptography: Historical background, –Elementary Ciphers (Substitution, Transposition and their Properties) –Caesar Cipher– Data Encryption Standard – Block Cipher Design Principles and Modes of Operation – Case study: AES							
UNIT II	PUBLIC KEY CRYPTOGRAPHY						9 Hours
Euclidean algorithm –Euler Theorem– Fermat Theorem– Totent functions– multiplicative and additive inverse – Selection of public and private keys–Case Study: Diffie-Hellman key Exchange – Elliptic Curve Architecture and Cryptography - Introduction to Number Theory – Confidentiality using Symmetric Encryption – Public Key Cryptography – Case Study: RSA							
UNIT III	AUTHENTICATION AND HASH FUNCTION						9 Hours
Security Handshake pitfalls–Online vs. offline password guessing–Reflection attacks Per-session keys and authentication tickets–Key distribution centers and certificate authorities Authentication requirements – Authentication functions – Message Authentication Codes– Hash Functions – Case Study: MD5, HMAC.							
UNIT IV	NETWORK SECURITY AND FIREWALLS						9 Hours
Public Key infrastructures– IPSec - IKE– SSL/TLS - Authentication Application: X.509 Authentication Service – Electronic Mail Security – PGP – S/MIME - IP Security – Web Security – Kerberos - Packet filters– Application level gateways– Encrypted tunnels							
UNIT V	HACKING						9 Hours
Introduction to Hacking – Hacking Process – Foot printing – System Hacking – Trojan Horses – Ethical Hacking – Attacks and Countermeasures							
						TOTAL:	45 Hours
FURTHER READING	Cyber Forensics, Security Management issues						
COURSE OUTCOMES							
After learning the course the student should be able to:							
CO1: Explain concepts related to applied cryptography, including symmetric cryptography, asymmetric cryptography, and digital signatures							
CO2: Understand the theory behind the security of different cryptographic algorithms.							
CO3: Understand common network vulnerabilities, defense mechanisms against network attacks, and cryptographic protection mechanisms.							
CO4: Apply the requirements of non-realtime security (email security) and ways to provide privacy, source authentication, message integrity, non-repudiation, proof of submission, proof of delivery, message flow confidentiality, and anonymity.							
REFERENCES:							
<ol style="list-style-type: none"> 1. William Stallings, “Cryptography and Network Security – Principles and Practices”,Pearson Education, Third Edition, 2016 2. Charlie Kaufman, Radia Perlman, and Mike Speciner, “ Network Security: PRIVATE Communication in a PUBLIC World”, Prentice Hall, ISBN 0-13-046019-2, 2017 3. Behrouz A. Foruzan, “Cryptography and Network Security”, Tata McGraw-Hill, 2013 4. Bruce Schneier, “Applied Cryptography”, John Wiley & Sons Inc, 2013. 5. Charles B. Pfleeger, Shari Lawrence Pfleeger, “Security in Computing”, Third Edition,Pearson Education, 2012 6. Wade Trappe and Lawrence C. Washington , “ Introduction to Cryptography withcoding theory” , Pearson Education, 2012. 7. Thomas Calabrese, “Information Security Intelligence : Cryptographic Principles andApplications”, Thomson Delmar Learning,2012. 8. http://nptel.ac.in/ 							

1902IT504	INTERNET OF THINGS			L	T	P	C
				3	2	0	4
AIM: The main objective of this course is to understand the IoT is presently a hot technology worldwide. Government, academia, and industry are involved in different aspects of research, implementation, and business with IoT.							
PREREQUISITE		Basic Programming Knowledge, Computer Architecture					
COURSE OBJECTIVES:							
<ol style="list-style-type: none"> 1. Study the concept of Microprocessor and Microcontrollers 2. Study what is Internet of Thing and learning concepts 3. Get basic knowledge of RFID technology, sensor technology and satellite technology 4. Students aware of resource management and security issues in Internet of Things 5. Study the concept of Internet of Things in the real world scenario 							
UNIT I	INTRODUCTION TO IOT						12 Hours
What is the Internet of Things? : History of IoT, About IoT, Overview and Motivations, Examples of Applications, Internet of Things Definitions and Frameworks: IoT Definitions, IoT Architecture, General Observations, ITU-T Views, Working Definition, IoT Frameworks, Basic Nodal Capabilities							
UNIT II	IOT PROTOCOLS						12 Hours
Sensors - Protocol Standardization for IoT – Efforts – M2M and WSN Protocols – SCADA and RFID Protocols – Issues with IoT Standardization – Unified Data Standards							
UNIT II	CASE STUDY						12 Hours
IEEE 802.15.4 – BACNet Protocol– Modbus – KNX – Zigbee Architecture - Software & Management Tools for IoT							
UNIT IV	BUILDING IOT WITH RASPBERRY PI AND GALILEO/ARDUINO						12 Hours
Physical device – Raspberry Pi Interfaces – Programming – APIs / Packages – Web services - Intel Galileo Gen2 with Arduino- Interfaces - Arduino IDE – Programming - APIs and Hacks – path planning – obstacle avoidance technique							
UNIT V	EXPERIMENTS USING IOT						12 Hours
Home Automation – Cities – Environment – Energy – Retail – Logistics - Agriculture - Industry - Health and Lifestyle - IoT and M2M							
REQUIREMENTS: Raspberry PI and Arduino Tool Kit							
						TOTAL:	60 Hours
COURSE OUTCOMES							
At the end of this course, students will able to, CO1: Apply microprocessor and microcontrollers concepts to solve various IoT problems CO2: Explain the concepts of IoT and protocols CO3: Illustrate various case studies and protocol architecture CO4: Develop a portable IOT using Arduino or equivalent boards and relevant protocols. CO5: Analyze applications of IOT in real time scenario.							
REFERENCES:							
1. Romesh Gaonkar , “Microprocessor Architecture, Programming, and Applications with the 8085”, Penram International Publishing (India) LTD, 2017							
2. Yu-Cheng Liu, Glenn A.Gibson, “Microcomputer Systems: The 8086 / 8088 Family - Architecture, Programming and Design”, Second Edition, Prentice Hall of India, 2014.							
3. Mohamed Ali Mazidi, Janice Gillispie Mazidi, Rolin McKinlay, “The 8051 Microcontroller and Embedded Systems: Using Assembly and C”, Second Edition, Pearson Education, 2013.							
4. Daniel Minoli, “Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications”, ISBN: 978-1-118-47347-4, Willy Publications. 2017							
5. Bernd Scholz-Reiter, Florian Michahelles, “Architecting the Internet of Things”, ISBN 978-3- 642-19156-5 e-ISBN 978-3-642-19157-2, Springer.,2016							
6. Arshdeep Bahga, Vijay Madiseti, “Internet of Things – A hands-on approach”, Universities Press, 2015							
7. http://nptel.ac.in/ & http://coursera.org/							

1904IT551	CASE TOOLS (MINI PROJECT 1)			L	T	P	C
			0	0	2	1	
AIM: The objective of this course is student develop mini project using CASE tools							
PREREQUISITE: Software Engineering and Project Management							
COURSE OBJECTIVES:							
<ol style="list-style-type: none"> 1. Learn the basics of OO analysis and design skills. 2. Be exposed to the UML design diagrams. 3. Learn to map design to code. 4. Be familiar with the various testing techniques 							
TO DEVELOP A MINI-PROJECT USING FOLLOWING PROBLEM STATEMENTS							
<ul style="list-style-type: none"> ✓ Identify Use Cases and develop the Use Case model. ✓ Identify the conceptual classes and develop a domain model with UML Class diagram. ✓ Using the identified scenarios, find the interaction between objects and represent them using UML Sequence diagrams. ✓ Draw relevant state charts and activity diagrams. ✓ Identify the User Interface, Domain objects, and Technical services. Draw the partial layered, logical architecture diagram with UML package diagram notation. ✓ Develop and test the Technical services layer. ✓ Develop and test the Domain objects layer. ✓ Develop and test the User interface layer. 							
Suggested domains for Mini-Project (not Limited too):							
<ul style="list-style-type: none"> • Passport automation system • Book bank • Online Examination • Online course reservation system • E-ticketing • E-Commerce • Recruitment system • Foreign trading system • Conference Management System • BPO Management System • Library Management System 							
Requirements: Argo UML or Eclipse IDE or Rational Suite or Visual Paradigm or equivalent							
						TOTAL:	45 Hours
COURSE OUTCOMES							
At the end of this course, students will able to, <ul style="list-style-type: none"> CO1: Design and implement projects using OO concepts. CO2: Use the UML analysis and design diagrams. CO3: Apply appropriate design patterns. CO4: Create code from design. CO5: Compare and contrast various testing techniques 							

1904IT552		STARTUP OPPORTUNITIES FOR IT ENGINEERS	L	T	P	C
			0	0	2	1
AIM: This course helps you understand the process of entrepreneurship from a technology-oriented background						
COURSE OBJECTIVES:						
	<ol style="list-style-type: none"> 1. Learn what it takes to become a “technopreneur” 2. Explore various methods for identifying opportunities 3. Learn how to conduct market research and provide evidence for the viability of the business idea 4. Develop a viable business proposition and learn to pitch your ideas for various audiences 5. Understand the dynamics of new venture development and team building 6. Develop the ability to translate a business idea into marketing and financial plans 					
Course Contents						
	<ol style="list-style-type: none"> 1. Introduction to Startups 2. Innovation & Entrepreneurship 3. Entrepreneurial Mindset, Entrepreneurial Skillset 4. Global Startup Eco System 5. IT based Startup Trends 6. Problems – Identification, Selection & Validation 7. Evolution of Technology & Startups 8. Startup Opportunity Identification 9. Business Model Trends – Examples 10. Startup Idea & Technology Landscape 11. Digital Marketing 12. Minimum Viable Product Development & Tools for Creating MVPs 13. Patentability 14. Raising Capital & Funding Models 15. Legal Procedures & Launchpad 					
					TOTAL:	30 HOURS
COURSE OUTCOMES:						
	After completion of the course, Student will be able to					
CO1	Explain Concepts of Innovation, Entrepreneurship and Startups in Technology					
CO2	Develop Startup or Business ideas, minimum viable products and business models for real life problems					
Evaluation Procedure						
	<ol style="list-style-type: none"> 1. Assignment 1– Review of IT based Startups – 20 Marks 2. Assignment 2– Problems, Problem Identification, Selection & Evaluation – 30 Marks 3. Assignment 3 – Review of Business Models of IT based Startups – 20 Marks 4. Presentation – Idea, Market Research Results, 1st MVP, Possible Fund Raising Model to be adopted, IP – 30 Marks 					
REFERENCES:						
	1. The High-Performance Entrepreneur by Subroto Bagchi					
	2. The Law of Success in Sixteen Lessons Paperback by Napoleon Hill					
	3. The E-Myth Revisited: Why Most Small Businesses Don’t Work and What to Do About It by Michael E. Gerber					
	4. https://www.edx.org/course/entrepreneurship-for-engineers					

1904GE551	LIFE SKILLS: APTITUDE – 1	L	T	P	C
		0	0	2	1
Course Objectives: The students should be made to:					
<ol style="list-style-type: none"> 1. To brush up problem solving skill and to improve intellectual skill of the students 2. To be able to critically evaluate various real life situations by resorting to Analysis Of key issues and factors 3. To be able to demonstrate various principles involved in solving mathematical problems and thereby reducing the time taken for performing job functions. 4. To enhance analytical ability of students 5. To augment logical and critical thinking of Student 					
Unit I	INTRODUCTION TO NUMBER SYSTEM, BASIC SHORTCUTS OF ADDITION, MULTIPLICATION, DIVISION	6 Hours			
Classification of numbers – Types of Numbers - Divisibility rules - Finding the units digit - Finding remainders in divisions involving higher powers - LCM and HCF Models - Fractions and Digits – Square, Square roots – Cube, Cube roots – Shortcuts of addition, multiplication, Division.					
Unit II	RATIO AND PROPORTION, AVERAGES	6 Hours			
Definition of Ratio - Properties of Ratios - Comparison of Ratios - Problems on Ratios - Compound Ratio - Problems on Proportion, Mean proportional and Continued Proportion Definition of Average - Rules of Average - Problems on Average - Problems on Weighted Average - Finding average using assumed mean method.					
Unit III	PERCENTAGES, PROFIT AND LOSS	6 Hours			
Introduction Percentage - Converting a percentage into decimals - Converting a Decimal into a percentage - Percentage equivalent of fractions - Problems on percentages - Problems on Profit and Loss percentage- Relation between Cost Price and Selling price - Discount and Marked Price - Two different articles sold at same Cost Price - Two different articles sold at same Selling Price - Gain% / Loss% on Selling Price.					
Unit IV	CODING AND DECODING, DIRECTION SENSE	6 Hours			
Coding using same set of letters - Coding using different set of letters - Coding into a number - Problems on R-model - Solving problems by drawing the paths - Finding the net distance travelled - Finding the direction - Problems on clocks - Problems on shadows - Problems on direction sense using symbols and notations.					
Unit V	NUMBER AND LETTER SERIES NUMBER AND LETTER ANALOGIES, ODD MAN OUT	6 Hours			
Difference series - Product series - Squares series - Cubes series - Alternate series - Combination series - Miscellaneous series - Place values of letters - Definition of Analogy - Problems on number analogy - Problems on letter analogy - Problems on verbal analogy - Problems on number Odd man out - Problems on letter Odd man out - Problems on verbal Odd man out					
TOTAL					30 Hours
COURSE OUTCOMES: At the end of the course, the student should be able to					
CO1: Learners should be able to understand number and solving problems least time using various shortcut					
CO2: Solve problems on averages; compare two quantities using ratio and proportion.					
CO3: Calculate concept of percentages, implement business transactions using profit and loss.					
CO4: Workout concepts of Coding and Decoding, ability to visualize directions and understand the logic behind a sequence.					
CO5: Learners should be able to find a series the logic behind a sequence.					
REFERENCES:					
<ol style="list-style-type: none"> 1. Arun Sharma, 'How to Prepare for Quantitative Aptitude for the CAT', 7th edition, McGraw Hills publication, 2016. 2. Arun Sharma, 'How to Prepare for Logical Reasoning for CAT', 4th edition, McGraw Hills publication, 2017. 3. R S Agarwal, 'A modern approach to Logical reasoning', revised edition, S.Chand publication, 2017. 4. R S Agarwal, 'Quantitative Aptitude for Competitive Examinations', revised edition, S.Chand publication, 2017. 5. Rajesh Verma, "Fast Track Objective Arithmetic", 3rd edition, Arihant publication, 2018. 6. B.S. Sijwalii and Indu Sijwali, "A New Approach to REASONING Verbal & Non-Verbal", 2nd edition, Arihant publication, 2014. 					
ASSESSMENT PATTERN :					
<ol style="list-style-type: none"> 1. Two tests will be conducted (25 * 2) - 50 marks 2. Five assignments will be conducted (5*10) - 50 Marks. 					

1902MCX03	ESSENCE OF INDIAN TRADITIONAL	L	T	P	C
-----------	-------------------------------	---	---	---	---

KNOWLEDGE							
				2	0	0	0
COURSE OBJECTIVES:							
	<ol style="list-style-type: none"> The course aims at imparting basic principles of thought process, reasoning and inferencing. Sustainability is at the core of Indian Traditional Knowledge Systems connecting society and nature. Holistic life style of Yogic-science and wisdom capsules in Sanskrit literature are also important in modern society with rapid technological advancements and societal disruptions. The course focuses on introduction to Indian Knowledge System, Indian perspective of modern scientific world-view and basic principles of Yoga and holistic health care system. 						
<ol style="list-style-type: none"> Basic Structure of Indian Knowledge System (i) Vedas, (ii) Uveda (Ayurveda, Dhanurveda, Gandhaveda, Sthaitya Adad) (iii) Vedang (Shiksha, Kalla, Nanrut, Grammar, Jyotisha Chhanda), (iv) Uraiga (Dharma Vastra, Shringa, Guarana, Tirmasra) Modern Science and Indian Knowledge System Yoga and Holistic Health care Case Studies. 							
				TOTAL:	30 HOURS		
COURSE OUTCOMES:							
After completion of the course, Student will be able to understand , connect up and explain basics of Indian Traditional knowledgemodern scientific perspective							
REFERENCES:							
<ol style="list-style-type: none"> V. Sivaramakrishna (Ed.), Cultural Heritage of India-Course Material, Bharatiya Vidya Bhavan, Mumbai,5th Edition, 2014 Swami Jitatmanand, Modern Physics and Vedant, Bharatiya Vidya Bhavan, Fritzof Capra, Tao of Physics Fritzof Capra, The wave of Life V N Jha (Eng. Trans.), Tarkasangraha of Annam Bhatta, Inernational Chinmay Foundation, Velliarnad,Amaku,am Yoga Sutra of Patanjali, Ramakrishna Mission, Kolkatta GN Jha (Eng. Trans.) Ed. R N Jha, Yoga-darshanam with Vyasa Bhashya, Vidyanidhi Prakasham, Delhi,2016 RN Jha, Science of Consciousness Psychotherapy and Yoga Practices, Vidyanidhi Prakasham, Delhi, 2016 P R Sharma (English translation), Shodashang Hridayam 							

1903IT001	SOFTWARE TESTING METHODS AND TOOLS	L	T	P	C
		3	0	0	3
AIM: The main objective of this course is used to introduce the concepts of software testing & its levels and automated testing tools					
PREREQUISITE: Software Engineering and Project Management					
COURSE OBJECTIVES:					
<ol style="list-style-type: none"> To know the behavior of the testing techniques to detect the errors in the software To understand standard principles to check the occurrence of defects and its removal. To learn the functionality of automated testing tools To understand the models of software reliability 					
UNIT I	TESTING ENVIRONMENT AND TEST PROCESSES	9 Hours			
World-Class Software Testing Model – Building a Software Testing Environment - Overview of Software Testing Process – Organizing for Testing – Developing the Test Plan – Verification Testing – Analysing and Reporting Test Results					
UNIT II	TESTING TECHNIQUES AND LEVELS OF TESTING	9 Hours			
Using White Box Approach to Test design - Static Testing Vs. Structural Testing – Code Functional Testing – Coverage and Control Flow Graphs –Using Black Box Approaches to Test Case Design – Random Testing – Requirements based testing –Decision tables –State-based testing – Cause-effect graphing – Error guessing – Compatibility testing – Levels of Testing - Unit Testing - Integration Testing - Defect Bash Elimination. System Testing - Usability and Accessibility Testing – Configuration Testing - Compatibility Testing - Case study for White box testing and Black box testing techniques					
UNIT III	INCORPORATING SPECIALIZED TESTING RESPONSIBILITIES	9 Hours			
Testing Client/Server Systems – Rapid Application Development Testing – Testing in a Multiplatform Environment – Testing Software System Security - Testing Object-Oriented Software – Object Oriented Testing – Testing Web based systems – Web based system – Web Technology Evolution – Traditional Software and Web based Software – Challenges in Testing for Web-based Software –Testing a Data Warehouse - Case Study for Web Application Testing.					
UNIT IV	TEST AUTOMATION	9 Hours			
Selecting and Installing Software Testing Tools - Software Test Automation – Skills needed for Automation – Scope of Automation – Design and Architecture for Automation – Requirements for a Test Tool – Challenges in Automation – Tracking the Bug – Debugging – Case study using Bug Tracking Tool.					
UNIT V	SOFTWARE TESTING AND QUALITY METRICS	9 Hours			
Testing Software System Security - Six-Sigma – TQM - Complexity Metrics and Models – Quality Management Metrics - Availability Metrics - Defect Removal Effectiveness - FMEA - Quality Function Deployment – Taguchi Quality Loss Function – Cost of Quality. Case Study for Complexity and Object Oriented Metrics.					
TOTAL:					45 Hours
FURTHER READING: Case study of Testing tools like Rational Robot, Amazon Tools					
COURSE OUTCOMES					
At the end of this course, students will able to,					
<ul style="list-style-type: none"> CO1: Explain the software by applying testing techniques to deliver a product free from bugs CO2: Evaluate the web applications using bug tracking tools. CO3: Investigate the scenario and the able to select the proper testing technique CO4: Explore the test automation concepts and tools CO5: Deliver quality product to the clients by way of applying standards such as TQM, Six Sigma CO6: Evaluate the estimation of cost, schedule based on standard metrics 					
REFERENCES:					
<ol style="list-style-type: none"> William Perry, “Effective Methods of Software Testing”, Third Edition, Wiley Publishing 2015 Srinivasan Desikan and Gopaldaswamy Ramesh, “Software Testing – Principles and Practices”, Pearson Education, 2014. NareshChauhan, “Software Testing Principles and Practices” Oxford University Press, New Delhi, 2014. Stephen Kan, “Metrics and Models in Software Quality”, Addison – Wesley, Second Edition, 2012. LleneBurnstein, “ Practical Software Testing”, Springer International Edition, Chennai, 2013 RenuRajani,Pradeep Oak, “Software Testing – Effective Methods, Tools and Techniques”, Tata McGraw Hill, 2010 http://nptel.ac.in/ 					

1901MGX01	TOTAL QUALITY MANAGEMENT			L	T	P	C
				3	0	0	3
AIM: The aim of this course is to address the need for skilled professionals who can contribute effectively towards Quality Management to engage the participants on contemporary issues pertaining to the management of quality in IT Industries							
COURSE OBJECTIVES:							
<ol style="list-style-type: none"> 1. To learn concepts, dimension quality and philosophies ofTQM. 2. To study the TQM principles and itsstrategies. 3. To impart knowledge on TQM tools for continuous improvement 							
UNIT I	INTRODUCTION						9 Hours
Definition of Quality - Dimensions of Quality - Quality Planning - Quality costs - Analysis Techniques for Quality Costs - Basic concepts of Total Quality Management - Historical Review - Quality Statements - Strategic Planning, Deming Philosophy - Crosby philosophy - Continuous Process Improvement - Juran Trilogy, PDSA Cycle, 5S, Kaizen - Obstacles to TQM Implementation							
UNIT II	TQM PRINCIPLES						9 Hours
Principles of TQM, Leadership - Concepts - Role of Senior Management - Quality Council, Customer satisfaction - Customer Perception of Quality, Customer Complaints, Service Quality, Customer Retention, Employee Involvement - Motivation, Empowerment, Teams, Recognition and Reward, Performance Appraisal, Benefits - Supplier Partnership - Partnering, sourcing, Supplier Selection, Supplier Rating, Relationship Development, Performance Measures - Basic Concepts, Strategy, Performance Measure.							
UNIT III	STATISTICAL PROCESS CONTROL (SPC)						9 Hours
The seven tools of quality - Statistical Fundamentals - Measures of central Tendency and Dispersion, Population and Sample, Normal Curve, Control Charts for variables X bar and R chart and attributes P, NP, C, and u charts, Industrial Examples, Process capability, Concept of six sigma - New seven Management tools							
UNIT IV	TQM TOOLS						9 Hours
Benchmarking - Reasons to Benchmark - Benchmarking Process, Quality Function Deployment (QFD)- House of Quality, QFD Process, and Benefits - Taguchi Quality Loss Function - Total Productive Maintenance (TPM) - Concept, Improvement Needs, and FMEA - Stages of FMEA							
UNIT V	QUALITY SYSTEMS						9 Hours
Concept, Requirements of ISO 9000 and Other Quality Systems - ISO 9000:2000 Quality System - Elements, Implementation of Quality System, Documentation, Quality Auditing, ISO 9000:2005 and 9001:2015, ISO 14000.							
TOTAL:						45 Hours	
FURTHER READING: Case Study: TQM Quality and Environmental Concepts in real World Applications, Environment Management system							
COURSE OUTCOMES							
At the end of this course, students will able to,							
<ol style="list-style-type: none"> CO1: Understand the concepts, dimension quality and philosophies ofTQM. CO2: Understand the principles of TQM and itsstrategies. CO3: Apply seven statistical quality and management tools CO4: Understand TQM tools for continuousimprovement. CO5: Understand the Quality Management system 							
REFERENCES:							
<ol style="list-style-type: none"> 1. Dale H.Bester filed, Total Quality Management, Pearson Education Inc., New Delhi,2003. 2. N. Gupta and B. Valarmathi, Total Quality Management, Tata McGraw-Hill Publishing Company Pvt. Ltd., New Delhi, 2009. 3. P.N. Muherjee, Total Quality Management, Prentice Hall of India, New Delhi,2006. 4. James R. Evans and William M. Lidsay, The Management and Control of Quality, South-Western 2002. 5. S. Kumar, Total Quality Management, Laxmi Publications Ltd. New Delhi,2006 							

1903IT002	VIRTUAL REALITY			L	T	P	C
				3	0	0	3
Prerequisite	Data Structures and Algorithms and Programming						
COURSE OBJECTIVES:							
The objective of this course is to provide a detailed understanding of the concepts of Virtual Reality and its applications.							
UNIT I	INTRODUCTION						9 Hours
Virtual Reality and Virtual Environment: Introduction, Computer graphics, Real time computer graphics, Flight Simulation, Virtual environment requirement, benefits of virtual reality, Historical development of VR, Scientific Landmark 3D Computer Graphics: Introduction, The Virtual world space, positioning the virtual observer, the perspective projection, human vision, stereo perspective projection, 3D clipping, Colour theory, Simple 3D modelling, Illumination models, Reflection models, Shading algorithms, Radiosity, Hidden Surface Removal, Realism-Stereographic image.							
UNIT II	GEOMETRIC MODELLING						7 Hours
Geometric Modelling: Introduction, From 2D to 3D, 3D space curves, 3D boundary representation -Geometrical Transformations: Introduction, Frames of reference, Modelling transformations, Instances, Picking, Flying, Scaling the VE, Collision detection. Generic VR system: Introduction, Virtual environment, Computer environment, VR technology, Model of interaction, VR Systems.							
UNIT III	VIRTUAL ENVIRONMENT						9 Hours
Animating the Virtual Environment: Introduction, The dynamics of numbers, Linear and Nonlinear interpolation, the animation of objects, linear and non-linear translation, shape & object in betweening, free from deformation, particle system. Physical Simulation: Introduction, Objects falling in a gravitational field, Rotating wheels, Elastic collisions, projectiles, simple pendulum, springs, Flight dynamics of an aircraft.							
UNIT IV	VR HARDWARE AND SOFTWARE						11 Hours
Human factors: Introduction, the eye, the ear, the somatic senses. VR Hardware: Introduction, sensor hardware, Head-coupled displays, Acoustic hardware, Integrated VR systems. VR Software: Introduction, Modelling virtual world, Physical simulation, VR toolkits, Introduction to VRML							
UNIT V	VR APPLICATIONS						9 Hours
Introduction, Engineering, Entertainment, Science, Training. The Future: Virtual environment, modes of interaction							
						TOTAL:	45 Hours
COURSE OUTCOMES:							
At the end of this course, students will able to, CO1: Understand the concepts of Computer Graphics and Multimedia CO2: Use various geometric modeling and Virtual environment techniques to create interactive applications CO3:Analyze various virtual environments for solving physical and virtual simulations CO4: Use of Virtual Hardware and Software to develop virtual modeling CO3: Develop Virtual Reality applications using trained models							
REFERENCES:							
1. John Vince, “Virtual Reality Systems “, Pearson Education Asia, 2007. 2. Anand R., “Augmented and Virtual Reality”, Khanna Publishing House, Delhi. 3. Adams, “Visualizations of Virtual Reality”, Tata McGraw Hill, 2000. 4. Grigore C. Burdea, Philippe Coiffet , “Virtual Reality Technology”, Wiley Inter Science, 2nd Edition, 2006. 5. William R. Sherman, Alan B. Craig, “Understanding Virtual Reality: Interface, Application and Design”, Morgan Kaufmann, 2008. 6. www.vresources.org 7. www.vrac.iastate.edu 8. www.w3.org/MarkUp/VRM							

1903IT003	INFORMATION THEORY AND CODING			L	T	P	C
				3	0	0	3
AIM: This course is used to provide various encoding/decoding techniques and multimedia processing techniques							
PREREQUISITE: Digital Principles System Design, Computer Networks							
COURSE OBJECTIVES:							

<ol style="list-style-type: none"> Understand error-control coding. Understand encoding and decoding of digital data streams. Be familiar with the methods for the generation of these codes and their decoding techniques. Be aware of compression and decompression techniques. Learn the concepts of multimedia communication 		
UNIT I	INFORMATION ENTROPY FUNDAMENTALS	9 Hours
Uncertainty, Information and Entropy – Source coding Theorem – Huffman coding – Shannon Fano coding – Discrete Memory less channels – channel capacity – channel coding Theorem – Channel capacity Theorem		
UNIT II	DATA AND VOICE CODING	9 Hours
Differential Pulse code Modulation – Adaptive Differential Pulse Code Modulation – Adaptive subband coding – Delta Modulation – Adaptive Delta Modulation – Coding of speech signal at low bit rates (Vocoders, LPC).		
UNIT III	ERROR CONTROL CODING	9 Hours
Linear Block codes – Syndrome Decoding – Minimum distance consideration – cyclic codes – Generator Polynomial – Parity check polynomial – Encoder for cyclic codes – calculation of syndrome – Convolution codes		
UNIT IV	COMPRESSION TECHNIQUES	9 Hours
Principles – Text compression – Static Huffman Coding – Dynamic Huffman coding – Arithmetic coding – Image Compression – Graphics Interchange format – Tagged Image File Format – Digitized documents – Introduction to JPEG standards		
UNIT V	AUDIO AND VIDEO CODING	9 Hours
Linear Predictive coding – code excited LPC – Perceptual coding, MPEG audio coders – Dolby audio coders – Video compression – Principles – Introduction to H.261 & MPEG Video standards.		
TOTAL:		45 Hours
FURTHER READING: Case study of Testing tools like Rational Robot, Amazon Tools		
COURSE OUTCOMES		
At the end of this course, students will able to, CO1: Explain various entropy encoding techniques CO2: Illustrate Data and Voice coding techniques CO3: Apply error-control method to solve real time problems CO4: Use compression and decompression techniques to solve real time applications CO5: Explain audio and video coding		
REFERENCES:		
<ol style="list-style-type: none"> Simon Haykin, “Communication Systems”, 4th Edition, John Wiley and Sons, 2016. Fred Halsall, “Multimedia Communications, Applications Networks Protocols and Standards”, Pearson Education, Asia 2013; Mark Nelson, “Data Compression Book”, BPB Publication 2013 Watkinson J, “Compression in Video and Audio”, Focal Press, London, 2012. http://nptel.ac.in/ 		

1903IT004	MAINFRAME COMPUTING	L	T	P	C
		3	0	0	3
AIM: To introduce students to the embedded systems, Real time OS and programming.					
COURSE OBJECTIVES:					
<ol style="list-style-type: none"> Learn the concepts of mainframe and usecases Study the concepts of capacity, scalability, Integrity and security Learn accessing and managing mainframe 					
UNIT I	NEW MAINFRAME	9 Hours			
Mainframe concepts-an evolving architecture- mainframe computer users factors contributing to mainframe use – mainframe workloads					
UNIT II	CAPACITY	9 Hours			
Capacity – elements of a system required for capacity – few server Vs Manyserver – service level agreement – managing the system to the SLA –architecture, running work and capacity – several servers on one physicalmachine – parallel sysplex and its measurements.					
UNIT III	SCALABILITY, INTEGRITY AND SECURITY	9 Hours			
Introduction to scalability – scalability concepts – scalability implementation on IBM system – integrity – security – introduction to availability – Inhibitors to availability - redundancy – z/OS elements for availability – Disaster recovery.					
UNIT IV	ACCESSING LARGE AMOUNT OF DATA	9 Hours			
Introduction – channel subsystem – control unit- DASD CKD architecture and DASD subsystem – multiple allegiance/Parallel Access volumes – database and Data sharing – Data placement and management					
UNIT V	SYSTEM MANAGEMENT AND AUTONOMIC COMPUTING	9 Hours			

Introduction – system data – configuration management – operating management – performance management – problem management – introduction to autonomic computing – self healing – self protecting – self optimizing.	
TOTAL: 45 Hours	
FURTHER READING: Automatic Chocolate Vending Machine, Bio-Metric Machine, etc	
COURSE OUTCOMES	
At the end of this course, students will able to, CO1: Control and co-operate all acquisition of computers with their associated software and peripherals. CO2: Maintain a standard configuration on all computers. CO3: Ensure efficient and effective use of computers by all users throughout Council. CO4: Creating datasets and performing operations on them CO5: Identify the different programming languages and Operating systems used on mainframe	
REFERENCES:	
1. Mike Ebbers, Frank Byrne, Pilar Gonzalez Adrados, Rodney Martin and Jon Veilleux "Redbook – Introduction to Mainframe - Large Scale Commercial Computing". First Edition December 2016, IBM Corp. 2. Lydia Parziale, Edi Lopes Alves, Klaus Egeler, Clive Jordan" Introduction to the New Mainframe: z/VM Basics", IBM Redbooks, 2014 3. http://nptel.ac.in	

HUMANITIES AND SCIENCES ELECTIVE I

1901MGX04	PRINCIPLES OF MANAGEMENT	L	T	P	C
		3	0	0	3
AIM: The aim of this course is to address broad and general guideline that regulates decision making and behavior within a group or organization					
COURSE OBJECTIVES:					
<ol style="list-style-type: none"> 1. To enable the students to study the evolution of Management 2. To relate, discuss, understand and present management principles, process and procedures. 3. To knowledge and understanding of the principles of management will enable the student manager or employee 					
UNIT I	INTRODUCTION TO MANAGEMENT AND ORGANIZATIONS	9 Hours			
Definition of Management – Science or Art – Manager Vs Entrepreneur - Types of managers - managerial roles and skills – Evolution of Management – Scientific, Human relations , System and contingency approaches.					
UNIT II	PLANNING	9 Hours			
Nature and purpose of planning – Planning Process – Types of planning – Objectives – Setting objectives – policies – Planning premises – Planning Tools and Techniques – Decision making steps and process.					
UNIT III	ORGANISING	9 Hours			
Nature and purpose – Formal and informal organization – Organization chart – Organization structure – Types – Line and staff authority – Departmentalization – Delegation of authority – Centralization and Decentralization – Job Design.					
UNIT IV	DIRECTING	9 Hours			
Foundations of Individual and Group behaviour – Motivation – Motivation theories – Motivational techniques – Job satisfaction – Job enrichment – Leadership – Types and theories of leadership – Communication – Process of communication – Barrier in communication – Effective communication – Communication and IT					
UNIT V	CONTROLLING	9 Hours			
System and process of controlling – Budgetary and non-budgetary control techniques – Use of computers and IT in Management control – Productivity problems and management – Control and performance – Direct and preventive control – Reporting					
TOTAL:					45 Hours
FURTHER READING: Decision roles of manager, Motivational thoughts.					
COURSE OUTCOMES					
At the end of this course, students will able to, CO1: Explain the elements of Management and Organization. CO2: Summarize the types, policies, tools and techniques in Planning in Management CO3: Relate the job design and human resource management in Organizing CO4: Illustrate the skills of leadership and communication CO5: Interpret the controlling techniques in Management					
REFERENCES:					

1. Stephen A. Robbins & David A. Decenzo & Mary Coulter, “Fundamentals of Management” 7 th Edition, Pearson Education, 2011.
2. Harold Koontz & Heinz Weihrich “Essentials of management” Tata McGraw Hill,2017.
3. Robert Kreitner & Mamata Mohapatra, “ Management”, Biztantra, 2018.
4. JAF Stoner, Freeman R.E and Daniel R Gilbert “Management”, 6 th Edition,Pearson Education, 2014.
5. Tripathy PC & Reddy PN, “Principles of Management”, Tata McGraw Hill, 2015

1901MGX05	ENGINEERING ECONOMICS AND FINANCE	L	T	P	C
		3	0	0	3
AIM: The aim of this course is to study engineering economics and finance accounting in demand supply, cost estimation and pricing					
COURSE OBJECTIVES:					
<ol style="list-style-type: none"> 1. To enable the students to study the engineering economics and finance 2. To relate, discuss, understand and present economics and finance accounting in demand supply, cost estimation and pricing methods 					
UNIT I	INTRODUCTION	9 Hours			
Managerial Economics-Relationship with other disciplines-Firms: Types, objectives and goals-Managerial decisions-Decision analysis.					
UNIT II	DEMAND & SUPPLY ANALYSIS	9 Hours			
Demand-Types of demand-Determinants of demand-Demand function-Demand elasticity-Demand forecasting-Supply-Determinants of supply-Supply function-Supply elasticity					
UNIT III	PRODUCTION AND COST ANALYSIS	9 Hours			
Production function>Returns to scale-Production optimization-Least cost input-Isoquants-Managerial uses of production function.Cost Concepts-Cost function-Determinants of cost-Short run and Long run cost curves-Cost Output Decision-Estimation of Cost					
UNIT IV	PRICING	9 Hours			
Determinants of Price-Pricing under different objectives and different market structures-Price discrimination-Pricing methods in practice					
UNIT V	ELEMENTARY TREATMENT	9 Hours			
FINANCIAL ACCOUNTING: Balance sheet and related concepts-Profit & Loss Statement and related concepts-Financial Ratio Analysis-Cash flow analysis-Funds flow analysis-Comparative financial statements-Analysis & Interpretation of financial statements. CAPITAL BUDGETING: Investments-Risks and return evaluation of investment decision-Average rate of return-Payback Period-Net Present Value-Internal rate of return.					
TOTAL:					45 Hours
COURSE OUTCOMES					
At the end of this course, students will able to,					
CO1: Explain the elements of Engineering Economics and Financial accounting methods					
CO2: Summarize the types, policies, tools and techniques in demand and supply					
CO3: Relate the production and cost analysis of management					
CO4: Illustrate the pricing methods in Economics and Financial accounting					
CO5: Interpret the Elementary treatment techniques in Economics and Financial accounting					
REFERENCES:					
<ol style="list-style-type: none"> 1. R. Kesavan, C.Elanchezhian and T.Sundar Selwyn, “Engineering Economics and Financial Accounting”, Laxmi Publications 2011 2. Maheswaran. S.N., “Management Accounting and Financial Control”, Sultan Chand, 2011 3. James. C., Vanhorn, “Fundamentals of Financial Management” PHI, 2012 4. Charles T.Homgren, “Cost Accounting”, PHI, 2012 					

1901MGX06	HUMAN RESOURCE DEVELOPMENT IN IT	L	T	P	C
		3	0	0	3
AIM: The aim of this course is to address the need for skilled professionals who can contribute effectively towards Human resource development and to engage the participants on contemporary issues pertaining to the management of quality in IT Industries					
COURSE OBJECTIVES:					

	1. To learn concepts, human resource development 2. To study the Macro and Micro perspective methods 3. To impart knowledge on Human resource skills and development	
UNIT I	MACRO PERSPECTIVE	9 Hours
HRD Concept, Origin and Need, HRD as a Total System; Approaches to HRD; Human Development and HRD; HRD at Macro and Micro Climate.		
UNIT II	MICRO PERSPECTIVE	9 Hours
Areas of HRD; HRD Interventions Performance Appraisal, Potential Appraisal, Feedback and Performance Coaching, Training, Career Planning, OD or Systems Development, Rewards, Employee Welfare and Quality of Work Life and Human Resource Information; Staffing for HRD: Roles of HR Developer; Physical and Financial Resources for HRD; HR Accounting; HRD Audit, Strategic HRD		
UNIT III	INSTRUCTIONAL TECHNOLOGY	9 Hours
Learning and HRD; Models and Curriculum; Principles of Learning; Group and Individual Learning; Transactional Analysis; Assessment Centre; Behaviour Modeling and Self Directed Learning; Evaluating the HRD		
UNIT IV	HUMAN RESOURCE TRAINING AND DEVELOPMENT	9 Hours
Concept and Importance; Assessing Training Needs; Designing and Evaluating T&D Programmes; Role, Responsibilities and challenges to Training Managers		
UNIT V	TRAINING METHODS	9 Hours
Training with in Industry (TWI): On the Job & Off the Job Training; Management Development: Lecture Method; Role Play; In-basket Exercise; Simulation; Vestibule Training; Management Games; Case Study; Programmed Instruction; Team Development; Sensitivity Training; Globalization challenges and Strategies of Training Program, Review on T&D Programmes in India.		
		TOTAL: 45 Hours
COURSE OUTCOMES		
At the end of this course, students will able to, CO1: Understand the concepts, Human resource development CO2: Compare and Contrast the principles of Micro and Marco development process CO3: Use various instructional technology and learning methods in Human resource development CO4: Understand Human resource development concepts and challenges CO5: Compare and Correlate various training methods in HRD		
REFERENCES:		
1. Nadler, Leonard : Corporat Human Resource Development, Van Nostrand Reinhold, ASTD, New York . 2. Rao, T.V and Pareek, Udai: Designing and Managing Human Resource Systems, Oxford IBH Pub. Pvt.Ltd., New Delhi , 2015. 3. Rao, T.V: Readings in HRD, Oxford IBH Pub. Pvt. Ltd., New Delhi , 2014. 4. Viramani, B.R and Seth, Parmila: Evaluating Management Development, Vision Books, New Delhi . 5. Rao, T.V.(et.al): HRD in the New Economic Environment, Tata McGraw-Hill Pub.Pvt, Ltd., New Delhi , 2013. 6. Rao, T.V: HRD Audit, Sage Publications, New Delhi . 2016 7. ILO, Teaching and Training Methods for Management Development Hand Book, McGraw-Hill , New York . 8. Rao, T.V: Human Resource Development, Sage Publications, New Delhi .		