Course Code	15B11CI412	Semester: Odd		Semester: VSession: 2020-21Month from Aug 2020 to Dec 2020	
Course Name	Operating Systems an	and Systems Programming			
Credits	4	4 Contact Hours		Iours	3-1-0
Faculty (Names)	Coordinator(s)	Sec 62: Alka Singhal, Sec 128: Akanksha Mehndiratta			Akanksha Mehndiratta
	Teacher(s) (Alphabetically)	Sec 62: Ashish Mehra, Kashav Ajmera Sec 128: Ambalika Sarkar, Dr. Neeraj Jain, Dr. Shilpa Budhkar			

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COURSE	OUTCOMES	COGNITIVE LEVELS
C311.1	Describe and explain the fundamental components of operating systems and system programming.	Understand Level (C2)
C311.2	Apply and compare various policies of scheduling in processes and threads in OS.	Apply Level (C3)
C311.3	Describe and discuss various resource management techniques of operating systems and compare their performances.	Apply Level (C3)
C311.4	Understand the concept of IPC and describe various process synchronization techniques in OS.	Understand Level (C2)
C311.5	Discuss the working of IO management and apply various disk scheduling techniques.	Apply Level (C3)
C311.6	Analyze and report appropriate OS design choices when building real- world systems.	Analyze Level (C4)

Module No.	Title of the Module	Topics in the Module	No. of Lectures for the module
1.	Introduction and Historical context of Operating Systems	What are Operating Systems? All components Description, The Evolution of OS: Batch Systems, multi programming systems, Time sharing systems, Parallel systems, Real Time systems, Distributed systems.	2
2.	Operating Structure and Architecture	Operating system structure: Micro kernel, Monolithic systems, Layered systems, Virtualization, Client-server model, Mobile Operating System. X86 architecture overview, Booting sequences, Boot loaders and their stages, BIOS and its routines, Interrupts.	2
3.	Process Concepts, Threads & Concurrency, Scheduling Concurrency & Synchronization issues,	Process concepts, Threads: Overview, Benefits, User and Kernel threads, Multithreading models. Scheduling, Operations on processes, Cooperative processes, IPC, Scheduling criteria, Scheduling algorithms, Multiple processor scheduling, Process synchronization: Critical section problems, Semaphores, Synchronization hardware and monitors.	10
4.	Deadlock	System model, Characterization, Methods for handling deadlocks. Deadlock prevention, Avoidance and detection, Recovery from deadlock	5

5.		Memory Management.	Background, Swapping, Contiguous memory allocation, Paging, Segmentation, Segmentation with Paging, Virtual Memory	8	
6.	6. File System management and Input output management		File concept, Access models, Directory structure, Protection, File-system Structure, Allocation methods, Free space management. Overview, I/O hardware, Application I/O interface.	2	
7.		Secondary Storage Management	Disk structure, Disk scheduling, Disk management., Swap- space management	2	
8.		Fault and Security Issues	Overview of system security, Security methods and devices, Protection, access, and authentication, Models of protection, Memory protection.	2	
9.		Distributed O.S	Int. to distributed operating systems, synchronization and deadlock in distributed systems	1	
10.		Case studies of OS	Windows, Linux ,IBM	2	
11.		System Programming	Introduction, Components of a Programming System: Assemblers, Loaders, Macros, Compliers, Formal System.	2	
13.		Interrupts and Exceptions	Synchronous and asynchronous interrupts, Calling a System Call from User Space, INT, Trap Handling, System call dispatch, arguments and return value, Device Interrupts.	2	
14.	14. Kernel Synchronization, System Calls and System Signals		Disabling Interrupts, Lock Implementation, Linux Synchronization Primitives	2	
			Total number of Lectures	42	
Eval	uatior	n Criteria			
Com T1 T2 End TA Tota	ComponentsMaximum MarksГ120Г220End Semester Examination35ГA25 (Quiz+ Assignment)Total100				
Reco Refe	<b>Recommended Reading material:</b> Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)				
1.	Charles Crowley "Operating System A Design Approach" TMH.				
2.	<ul> <li>Andrew S. Tanenbaum "Operating Systems Design and Implementation", Third Edition, Prentice Hall</li> <li>Publications 2006</li> </ul>				
3.	A.S.	Tanenbaum, "Modern	Operating Systems", 2 <sup>nd</sup> edition, Prentice Hall India.		
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4. A.Silberschatz, P.Galvin, G. Gagne, "Operating systems concepts" Willey international company (sixth edition)

**5.** Gary Nutt, "Operating Systems – A modern perspective", Pearson Education

6.	David Solomon and Mark Russinovich ," Inside Microsoft Windows 2000", Third Edition, Micorosoft Press
7.	D. M. Dhamdhere, "Systems Programming and Operating systems" TMH, 2 <sup>nd</sup> revised edition.2006
8.	ACM/IEEE transactions on operating systems concepts.
9.	www.vmware.com
10.	www.luitinfotech.com/kc/what-is-cloud-computing.pdf
11.	https://cs162.eecs.berkeley.edu/static/sections/section8.pdf
12.	Charles Crowley "Operating System A Design Approach" TMH.

Subject Code	15B17	7CI472	Semester: Odd	Semester V Session 2020-21	
			Month from Aug 2020 to Dec 2020		
Subject Name	Operat	ting Syster	and System Programming Lab		
Credits		2	Contact Hours 0-0-1		
Faculty	Coordina	ator(s)	Prashant Kaushik & Ka	shav Ajmera	
(Names)	Taaahar	(c)	Amanpreet Kaur, Ankit Vidvarthi, Ashish Mishra, Kashav Aimera,		

Teacher(s) (Alphabetically)	Amanpreet Kaur, Ankit Vidyarthi, Ashish Mishra, Kashav Ajmera, Kirti Aggarwal, Niyati Aggrawal, Prashant Kaushik, Shardha Porwal, Sherry Garg, and Somya Jain

COURSE	COGNITIVE LEVELS			
C371.1	Understand Various Unix Commands.	Understand Level (Level 2)		
C371.2	Develop programs to create different types of processes using pthread library under Linux environment.	Apply Level (Level 3)		
C371.3	Develop programs to implement resource management task like CPU scheduling algorithms, deadlock handling.	Apply Level (Level 3)		
C371.4	Develop programs to implement and test various synchronization techniques like semaphores, binary semaphore and monitors via different classical test suites.	Apply Level (Level 3)		
C371.5	Design and analyze various disk-scheduling algorithms, memory management schemes, file management systems.	Analyze Level (Level 4)		
Evaluatio	n Criteria			
Compone	nts Maximum Marks			
Lab Test-1 20				
Lab Test-220				
Day-to-Da				
(Project, Lab Assessment, Attendance)				
Total	100			

Module No.	Торіс	No. of Labs
1.	Unix Commands	1
2.	Process creation/ Inter process communication (IPC)	1
3.	Processes creation using pthread library under Linux environment.	1
4.	Synchronization techniques like semaphores, binary semaphore and monitors via different classical test suites.	2
5.	Resource management task like CPU scheduling algorithms, deadlock handling.	1
6.	Disk-scheduling algorithms, memory management schemes, file management systems.	1

<b>Recommended Reading material:</b> Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc.)			
1.	Charles Crowley "Operating System A Design Approach" TMH.		
2.	Andrew S. Tanenbaum "Operating Systems Design and Implementation", Third Edition, Prentice Hall Publications 2006		
3.	A.S. Tanenbaum, "Modern Operating Systems", 2 <sup>nd</sup> edition, Prentice Hall India.		
4.	A.Silberschatz, P.Galvin, G. Gagne, "Operating systems concepts" Willey international company (Ninth edition)		
5.	Gary Nutt, "Operating Systems – A modern perspective", Pearson Education		
6.	David Solomon and Mark Russinovich , "Inside Microsoft Windows 2000", Third Edition, Micorosoft Press		
7.	Milan Milenkovic, "Operating Systems: Concepts and Design", McGraw-Hill computer science series		
8.	ACM/IEEE transactions on operating systems concepts.		
9.	www.vmware.com		

Course Code	15B17CI575	Semester: Odd		Semester: V Session: 2020-2021	
				Month from Aug 2020 to Dec 2020	
Course Name	Open Source Softwar	re Lab			
Credits	1		Contact <b>H</b>	Iours	0-0-2
		0			
Faculty (Names)	Coordinator(s) Dr. Ankita Verma (J62), Mr. Himanshu Mittal (J128)			nshu Mittal (J128)	
	Teacher(s) (Alphabetically)	J62: Dr. Ankita Verma, Dr. Adwitiya Sinha ,Dr. Archana Purwar, Dr. Indu Chawla, Dr. Megha Rathi, Dr. Parul Agarwal, Dr. Sandeep Kumar Singh, Dr. Suma Dawn			

COURSE	OUTCOMES	COGNITIVE LEVELS
C375.1	Demonstrate the working of Git repository hosting service through git commands to manage files, support version control and contribute to open source community by providing enhanced versions.	Understand Level (Level 2)
C375.2	Apply a mix of Client, Server and Database technologies to solve Open Source Software issues/ to enhance projects.	Apply Level (Level 3)
C375.3	Develop Server-side programs using python with Database Servers- SQL, MongoDb	Apply Level (Level 3)
C375.4	Analyze baseline methods for pre-processing, clustering and classification algorithms using scikit-learn python libraries	Analyze Level (Level 4)
C375.5	Build J2EE Programs using JDBC Connectivity with SQL Database and Apache/ Glassfish as web servers.	Create Level (Level 6)

Module No.	Title of the Module	List of Experiments	СО	#Labs
1.	Introduction to GitHub & Sustainable Development Goals (SDG's)	<ul> <li>Read and explore the Github and Sustainable Development Goals.</li> <li>Create a simple program and upload it on Github.</li> <li>Extract one open source project from Github. Perform the reverse engineering of the same.</li> </ul>	C375.1	1
2.	Introduction To Python	• Making use of lists, tuples, and dictionaries, indexing and slicing to access data	C375.2	1
3.	Python	• Create user defined functions using built-in functions such as <b>filter (f, a)</b> from python libraries.	C375.3	1
4.	Numpy, SciPy, Matplotlib (Python)	Write python programs using various functions of Numpy, SciPy and Matplotlib library.	C375.4	2
5.	Beautiful Soup (Python), Pandas, MongoDB	<ul> <li>Write a program using Beautiful Soup for scrapping data from web, store in csv files and process them.</li> <li>Write a program for processing data stored in MongoDB using Pandas.</li> </ul>	C375.5	2
6.	Java Script, Java Servlet and Java	• Write programs for building web-pages using java script.	C375.5	2

	Server Pages.	• Buildweb-based applications using server-side programming – Java Server Pages (JSP) and Java Servlet.		
7.	Scikit-Learn (Python)	• Write python programs for data analysis, feature engineering, clustering and classification.		2
Evaluatio	on Criteria		'	
Components		Maximum Marks		
LabTest1		20		
LabTest2		20		
Evaluatio	n	30		
Attendan	ce	15		
Lab record maintenance		15		
and submission				
Total		100		

**Recommended Reading material:** Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

1.	https://guides.github.com/
2.	https://sustainabledevelopment.un.org/
3.	Python Cookbook by David Beazley and Brian K. Jones
4.	Head First Servlets & Java Server Pages byBryan Basham, Kathy Sierra, and Bert Bates
5.	Python for Data Analysis, by Wes McKinney

Course Code	15B17CI576	Semester: Odd	Semester: Odd		Semester: V Session: 2020 -2021		
				Months fro	<b>m</b> Aug 2020 to Dec 2020		
				(Due to COVID-19 pandemic, it was ru in Fast Track mode from 2 June'21 to June'21)			
Course Name	Information Security Lab						
Credits		1	Contact Hours 2		2		
Faculty (Names)	Coordinator(s)	Amanpreet Kau	r, Arpita	Jadhav Bhat	, Nitin Shukla		
	Teacher(s) (Alphabetically	)					

COURSE OUT	TCOMES	COGNITIVE LEVEL			
C374.1	Demonstrate and illustrate the different cipher techniques and Understand Level (Level 2)				
	understand various anti-virus and anti worms				
C374.2	Develop and make a code to implement various Symmetric	Apply Level (Level 3)			
	key, Asymmetric key cryptographic techniques and				
	steganography techniques				
C374.3	Apply a client server programming for symmetric, asymmetric	Apply Level (Level 3)			
	algorithms and key exchange algorithms, Application of				
	information security to real world problems				
C374.4	Examine and analyze the packet information for different	Analyze Level (Level 4)			
	protocols using Wireshark.				

Module No.	Title of the Module	List of Experiments	СО
1.	Cryptography	Introduction to Cryptography	C374.1
2.	Ciphers	Implementation of Cipher using Transposition techniques and Caesar Cipher	C374.2
3.	Ciphers	Implementation of Substitution Ciphers: Hill Cipher and Polyalphabetic Cipher	C374.2
4.	Symmetric key cryptography	Introduction to Symmetric key cryptography	C374.1
5.	Data Encryption Standard	Implementation of Data Encryption Standard (DES)	C374.2
6.	Public key cryptography	Introduction to Public key cryptography and Digital signature	C374.2
7.	Key Exchange Algorithm	Implementation of Diffie Hellman Key Exchange Algorithm	C374.3

8.	Client server programming	Client server programming using TCP	
9.	Client server programming	Implementation of DES and RSA using Client server programming	C374.3
10.	Steganography	Introduction to Steganography	C374.2
11.	Antivirus and Anti-Worms	Introduction to Antivirus and Anti-Worms, and Wireshark tool	C374.1
12.	Applications of Information Security	Applications of Information Security to real world problems	C374.3
13.	Wireshark	Understanding of Secure-socket layer, Application Layer (HTTP, FTP, DNS) using Wireshark tool	C374.4
Evaluation	on Criteria		
Compon	ents Maximu	m Marks	
Lab Test	-1 20		
Lab Test	-2 20		
Quiz 1	15		
Quiz 2	15		
Project	15		
Attendan	ce 15		
Total	100		

Project based learning: The students are grouped into groups of size 5-6 and will be implementing a secure client server program with required encryption techniques. The student will analyze the requirements and select the required solutions. This will help in the employability of students in the information security sector.

Reco Refe	<b>Recommended Reading material:</b> Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)				
1.	Information Security, Principles and Practice, Mark Stamp, Wiley				
2.	Security in Computing 5thEdition, Charles P Fleeger et. al Prentice Hall				
3.	The InfoSec Handbook: An Introduction to Information Security- Apress Open				
4.	Information Security: The Complete Reference, Second Edition- Mark Rhodes Ousley				
5.	Cracking Codes with Python: An Introduction to Building and Breaking Ciphers-Al Sweigart				

Course Code		15B19CI591	Semester: Odd Semeste		r: V	Session: 2020 -2021	
					Month f	rom A	Aug 2020 to Dec 2020
Course Na	ime	Minor Project-1					
Credits		2		Contact I	Contact Hours		4
Faculty (N	ames)	Coordinator(s)	ANKIT VIDH	YATHI, M	UKESH S	SARAS	SWAT
		Teacher(s) (Alphabetically)	ALL FACULTY				
COURSE	COURSE OUTCOMES COGNITIVE LEVELS						
C350.1	Analyze chosen literature addressing real world research problem to Analyze Level (C4)						
C350.2	Build technical report detailing the software specification, design, test plan, and implementation details.						
C350.3	Build a practicable solution for the research problemCreate Level (C6)						
C350.4	Evaluate results to test the effectiveness of the proposed solutionEvaluate Level (C5)						
C350.5	Develop effective communication skills for presentation of project Apply Level (C3)						

Evaluation Criteria				
Components	Maximum Marks			
Viva-1	20			
Viva-2	20			
D2D	60			
Total	100			

	Detailed Syllabus.						
Course Code	15B28CI582	Semester: Odd	Semester: V Session 2020 -2021				
			Month from Aug 2020 to Dec 2020 (Due to COVID-19 pandemic, it was run in Fast Track mode from 2 June'21 to 21 June'21)				
Course Name	Multimedia Development Lab						
Credits	1	Contact Hours	0-0-2				

Faculty (Names)	Coordinator(s)	Dr. Niyati Aggrawal
	Teacher(s) (Alphabetically)	Dr. Niyati Aggrawal, Mrs. Purtee Kohli

COURSE	OUTCOMES	COGNITIVE LEVELS
C372.1	Illustrate aesthetics of visual composition.	Understand Level (Level 2)
C372.2	Demonstrate various operations in GIMP such as, applying filters and effects, colour and tonal adjustments, automating tasks, image editing, image enhancement, layer masking, etc.	Understand Level (Level 2)
C372.3	Design graphics using GIMP animations and use clone and heal tool for picture restoration.	Design Level (Level 3)
C372.4	Demonstrate various operations in GIMP such as, Smoke effect, Cartoon Effect and remove watermark, creative Text.	Design Level (Level 3)
C372.5	Create graphics layouts and Logo design using GIMP.	Design Level (Level 3)

Module No.	Title of the Module	List of Experiments	СО
1	Introduction to Digital Graphics	<ul><li>Exploring Gimp Manual</li><li>Understanding Tool Box and Canvas</li></ul>	C372.1
2	Image Editing	<ul> <li>Transform tool, selection tool, Pen tool, Brush tool, Text tool etc.</li> <li>Gimp Layers</li> <li>Water marking</li> </ul>	C372.2
3	Animation Concepts	<ul> <li>Filters and effects,</li> <li>clone tool, heal tool</li> <li>creation of GIF files</li> </ul>	C372.3 and C372.4
4	Logo Design	<ul><li> 2D, 3D logo</li><li> Adding effects to Logo</li></ul>	C372.5

Evaluation Criteria		
Components	Maximum Marks	
Lab Test 1	20	
Lab Test 2	20	
Day-to-Day- Evaluation/	Mini-Project 40	
Day-to-Day- Attendance	20	
Total	100	

Project Based Learning: Students, working in pairs or in small groups will be encouraged to design 2D images in GIMP for forming real-life requirements such as book-cover/ comic strip, logos, and other such desirables. These may be used as stand-alone objects or in conjunction with other designs to form an aggregated requirement.

<b>Recommended Reading material:</b> Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)				
Multimedia,	1. "Multimedia – An Introduction" by John Villamil and Louis Molina.			
GIMP	3. https://www.javatpoint.com/gimp			
	4. https://www.gimp.org/books/			
	5. https://www.gimp.org/			
6. https://howtogimp.com/help/help-with-gimp/gimp-tutorials/				
Additional read	ing material may be given to the students as and when required.			

Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development

The students study various designs and drawing structures to help them with development of UI or logos or models for aggregation in a page. The students are given constructive feedback for their designs. These give exposure to students for understanding industrial / professional requirements for designing interfaces.

	<b>F</b>				
Course Code	16B1NHS433	Semester: Odd		Semester: V Session: 2020 -2021	
				Month	from Aug 2020 to Dec 2020
Course Name Financial Manageme		nt			
Credits	3		Contact Hours		3-0-0
Faculty (Names)	Coordinator(s)	Dr. Mukta Ma	ni (Sec-62)	and Dr. S	akshi Varshney (Sec-128)
	Teacher(s)Dr. Mukta Ma(Alphabetically)		ni, Dr. Saks	hi Varshr	ey, Dr. Shirin Alavi

COURSE	OUTCOMES	COGNITIVE LEVELS
C303-3.1	Analyze the time value of money in taking investment decisions.	Analyze (Level 4)
C303-3.2	Contrast the various forms of business organizations and evaluate their financial performance.	Evaluate (Level 5)
C303-3.3	Evaluate investment projects using capital budgeting techniques	Evaluate (Level 5)
C303-3.4	Apply the concept of cost of capital into evaluation of investment projects	Apply (Level 3)
C303-3.5	Evaluate the leverage capacity of a business and its application in selection of long term sources of finance.	Evaluate (Level 5)
C303-3.6	Understand the practical considerations for managing working capital requirement in a firm.	Understand (Level 2)

Module No.	Title of the Module	Topics in the Module	No. of Lectures for the module
1.	Introduction	Basic financial concepts-Meaning of Accounting, Accounting Concepts and Conventions, Introduction to Double Entry system and Accounting equation, Definition and Objectives of Financial management, Finance functions and Role of Finance manager	4
2.	Time value of Money	Compounding, Discounting, Annuity, Perpetuity, Loan Amortization	6
3.	Analysis of Financial Statements	Understanding of Balance Sheet and Income Statements, Ratio Analysis, Interpretation, Importance and limitations	7
4.	Capital Budgeting: Principle Techniques	Nature of Capital Budgeting, Evaluation Techniques: Discounting (NPV, IRR etc.) and Non-discounting Techniques (payback, ARR etc)	5
5.	Long Term Sources of Finance	Definition, types, advantages and disadvantages	3
6.	Concept and measurement of cost of capital	Definition, measurement of specific costs, computation of Overall Cost of Capital,	4
7.	Cash Flows for Capital Budgeting	Identification and determination of relevant cash flows	5

8.	Leverages and Capital structure decision and Working Capital Management	Break Even Analysis, Operating, Financial and combined leverage, Capital structure EBIT- EPS analysis, Concept of working capital management, Practical Considerations in Working capital management	5
9.	Project presentation	15	3
		Total lectures	42

Evaluation Criteria			
Components	Maximum Marks		
T1	20		
T2	20		
End Term	35		
ТА	25 (Project, Class Participation)		
Total	100		

Recomm Referen	<b>Recommended Reading material:</b> Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)		
1.	Khan, M.Y. and Jain, P.K., <i>Financial Management: Text, Problems and Cases</i> , 5th ed, Tata McGraw Hill, 2007.		
2.	Chandra, P., Financial Management Theory and Practice, 6th ed., Tata McGraw Hill, 2004.		
3.	Pandey, I.M., Financial management, 9th ed, Vikas Publishing House Pvt Ltd, 2006		
4.	Van Horne, J.C. and Wachowicz, J.M., <i>Fundamentals of Financial Management</i> , 11th ed, Pearson Education, 2001		
5.	Kishore, R.M., Financial Management, 6th ed, Taxmann, 2007.		

Electure wise Dreakup				
Subject Code	16B1NHS434	Semester: Odd	Semester: V Session:2020-21	
			Month from Aug 2020 to Dec 2020	
Subject Name	Ibject Name Introduction to Contemporary Forms of Literature			
Credits	3	Contact Hours	3-0-0	

Faculty	Coordinator(s)	Dr. Monali Bhattacharya
(Names)	Teacher(s) (Alphabetically)	Dr. Monali Bhattacharya

Course Out	com	ies:		
	Co	ourse Outcome		COGNITIVE LEVELS
C303-6.1	6.1 Interpret & relate with the genres, periods, and conventional as well a experimental forms of literature as current ethical, technological and cultur reflections of society.			as Understand ral Level (C2)
C303-6.2	Ap con	ply literary and linguistinstructs inculcating huma	ic theories on the texts to identify them as cultur an values in the society.	al Apply Level (C3)
C303-6.3	An thr the	alyze social, cultural, m ough cloze study of matically and stylisticall	oral and linguistic changes in contemporary wor select representative texts of different cultur y.	ld Analyse Level (C4)
C303-6.4	De inc ain en	termine the reciprocal lividually and/or through n to analyze social, cult vironment, giving holistic	relationship between the individual and cultu a research based paper/poster presentation with a ural and moral fibre of youth in multidisciplina c solutions for sustainable development of society.	re Evaluate Level an (C5) ry
C303-6.5	Cro hav tea	eate literary, non-literar ving moral and cultural s m.	y write-up with proper applied grammar usag significance for today's world individually and in	e, Create a Level(C6)
•				i
Module No.	•	Subtitle of the Module	Topics in the module	No. of Hours for the module
1.		Introducing Literary Theories	<ul> <li>From Formalism to Reader Response Theory: Major Terms &amp; Concepts</li> <li>Narrative Art &amp; Narratology</li> <li>Language &amp; Style: An Introduction</li> </ul>	12
2.		Introducing New Forms & Sub Genres Today: Features & Portions	<ul> <li>New Fiction: Graphic Novels, Cyberpunk</li> <li>Non Fiction: Memoirs &amp; Autobiographies, Biographies &amp; Personal Narrative</li> </ul>	6
3.		Spiritual Literature	<u>Siddhartha</u> - Hermen Hesse (novella)	4
4.		Travel Literature	<i>Eat, Pray &amp; Love (Travelogue &amp; cinematic adaptation)</i>	4
5.		Written Communication Through Non-Fiction	Diary, Blog, Travelogue	4

6.	Commonwealth / Post Colonial Literature	<u>Hayavadana (Short Play)</u> - Girish Karnad	4
7.	European Literature	<u>Brave New World – Aldous Huxley (Science</u> <u>Fiction)</u>	4
8	Canadian Literature	The Penelopiad- Margaret Atwood	4
	42		

Evaluation C	riteria
Components	Maximum Marks
T1	20
T2	20
End Semester	Examination 35
TA	25 (Assignment, Project, Class Interaction)
Total	100
Recommendee	d Reading material:
Recommended	Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books,
Reference Boo	ks, Journals, Reports, Websites etc. in the IEEE format)
1.	Margaret Atwood, 'The Penelopiad', 1 <sup>st</sup> Edition, Canongate Series, Knopf, Canada, 2005.
2.	M.H. Abrams, 'A Glossary of Literary Terms'.7 <sup>th</sup> Edition, Hienle & Hienle: Thomson Learning, USA, 1999.
3	Mark William Roche, 'Why Literature matters in the 21 <sup>st</sup> Century', 1 <sup>st</sup> Edition, Yale University Press, 2004.
4	Girish Karnad, 'Hayavadana', 1 <sup>st</sup> Edition, Oxford University Press, Delhi, 1975 (30 <sup>th</sup> Impression, 2012).
5	Aldous Huxley, 'Brave New World', 1 <sup>st</sup> Edition, Harper Collins, 2004.
6	Hermen Hesse, 'Siddhartha', 1 <sup>st</sup> Edition. New Directions, US, 1951. For online version: https://www.gutenberg.org
7	Elizabeth Gilbert, 'Eat, Pray & Love. 1st Edition, Penguin, US, 2006.

Subject Code	16B1NHS435	Semester: Odd	Semester: VSession: 2020-21Month from Aug 2020 to Dec 2020
Subject Name	SOCIOLOGY OF MEDIA		
Credits	3	Contact Hours	2-1-0

Faculty	Coordinator(s)	Prof. Alka Sharma
(Names)	Teacher(s) (Alphabetically)	Prof. Alka Sharma

COURSE	OUTCOMES	COGNITIVE LEVELS
C303-2.1	Demonstrate a basic understanding of different concepts used in the systematic study of Sociology of Media	Understand level (C 2)
C303-2.2	Examine various sociological theoretical orientation towards media and society.	Analyze level (C 4)
C303-2.3	Analyze the key issues related to the processes of Production of Media, Popular Culture and consumer culture.	Analyze level (C 4)
C303-2.4	Critically evaluate the major methods of Cultural Consumption, Social Class & the process of construction of subjectivities and audience reception in new Media	Evaluate level (C 5)
C303-2.5	Create positive and critical attitude towards the use of new media and understanding of threats of Digital Age	Create level (C 6)

Module No.	Title of the Module	Topics in the Module	No. of Lectures for the module
1.	Introduction	Introduction to the Course	1
2.	Concepts and Theoretical Orientation of Sociology of Media	<ul> <li>Different concepts related to Sociology of media</li> <li>Functionalist Approach to the Sociology of Media</li> <li>Critical Approach to the Sociology of Media</li> <li>Symbolic Interactionist Approach to the Sociology of Media</li> <li>Different theories of Media</li> </ul>	8
3.	Concept of Popular Culture and its critical analysis	<ul> <li>What is popular culture?</li> <li>Difference between 'pop' culture and 'high' culture</li> <li>What distinguishes popular culture from other kinds of culture (art, folk culture)? Is there a distinction at all anymore?</li> <li>Visualizing Society through 'pop' culture/ media</li> <li>Risks and rituals that come with Popular Culture</li> </ul>	8
4.	New media	<ul> <li>Difference between tradition media and new media</li> <li>New media as technology</li> <li>New Information Technology (brief history in case of India)</li> </ul>	5

5.	Media & State	<ul><li>Mediatization of Society</li><li>Free-speech Media</li></ul>	5			
6.	Consumption of Media and Media reception	<ul> <li>Social Actors as Audience/ Audience as market– Theory</li> <li>Media effects: Media and representations (gender, ethnic)- the under-representation and misrepresentation of subordinate groups.</li> <li>Media and the construction of reality: media logic and cultivation analysis theory</li> <li>Information Society vs Informed Society</li> <li>Cultural Consumption and Social Class</li> </ul>	9			
7.	Media in Global Age	<ul> <li>Rise of Network Society- Manuel Castells</li> <li>Global Media: impact of market &amp; state</li> <li>Global Perspectives: The world on our doorstep</li> <li>Marketing and aesthetics in everyday life</li> </ul>	6			
		Total number of Lectures	42			
Eval	uation Criteria					
Com T1 T2 End S TA Tota	ComponentsMaximum MarksT120T220End Semester Examination35TA25 (Project, Presentation and attendance)Total100					
Reco Refe	mmended Reading materi rence Books, Journals, Repo	<b>al:</b> Author(s), Title, Edition, Publisher, Year of Publication etc. orts, Websites etc. in the IEEE format)	( Text books,			
1.	Ritzer, George, and Steven Miles. " <i>The changing nature of consumption and the intensification of McDonaldization in the digital age.</i> " Journal of Consumer Culture 19, no. 1, pp 3-20, 2019.					
2.	<b>2.</b> Turow, Joseph. <i>Media today: An introduction to mass communication</i> . Taylor & Francis, 2011.					
3.	Curran, James. Media and	society. Bloomsbury Publishing, 2010.				
4	JA Fisher 'High Art v/s Low Art, in Berys Nigel Gaut & Dominic Lopes (eds.), <i>The Routledge Companion to Aesthetics</i> . Routledge 2001					

#### DETAILED SYLLABUS Lecture-wise Breakup

Littlife wise Di takup					
Course Code	16B1NHS532	Semester: Odd	Semester: I Session: 2020-21		
			Month from Aug 2020 to Dec 2020		
Course Name	Planning and Ec	conomic Development			
Credits	3	Contact Hours	3-0-0		

Faculty (Names)	Coordinator(s)	Dr. Akarsh Arora
(ivalies)	Teacher(s) (Alphabetically)	Dr. Akarsh Arora, Dr. Amandeep Kaur

COURSE	COGNITIVE LEVELS	
C303-4.1	Understand the issues and approaches to economic development.	Understand level (C2)
C303-4.2	Evaluate National income accounting, human development index and sustainable development.	Evaluate level (C5)
C303-4.3	Apply an analytical framework to understand the structural characteristics of development.	Apply level (C3)
C303-4.4	Analyze the role of Macroeconomic stability & policies and Inflation in the development process.	Analyze level (C4)
C303-4.5	Evaluate the importance of federal development and decentralization.	Evaluate level (C5)

Module No.	Title of the Module	Topics in the Module	No. of Lectures for the module
1.	Economic Development and its Determinants	Economic growth and development. Indicators of development. Approaches to economic development. Rostows Stages of Growth.	5
2.	National Income Accounting	National Income Accounting, Green GNP and Sustainable development	5
3.	Indicators of development	PQLI, Human Development Index (HDI) and gender development indices.	4
4.	Demographic Features, Poverty and Inequality	Demographic features of Indian population; Rural-urban migration; Growth of Primary, Secondary and Tertiary Sector.	5
5.	Inflation and Business Cycles	Inflation. Business cycle. Multiplier and Accelerator Interaction.	6
6.	Macro-Economic Stability & Policies	Monetary Policy. Fiscal Policy. Role of Central Bank & Commercial banks in the development of the country. Balance of payments; currency convertibility and Issues in export-import policy.	6
7.	Federal Development	The Federal Set-up - The Financial Issues in a Federal Set-up, Principles for Efficient Division of Financial Resources between Governments. Financial Federalism under Constitution. Finance Commissions in India, Terms of References and its Recommendations	6

8. Planning and		Need for planning, Decentralisation, Rural and	5
0.	Development	Urban local bodies.	
		Total number of Lectures	42
Evaluation Criteria			
Components		Maximum Marks	
T1		20	
T2		20	
End Semester Examination		35	
ТА		25 (Assignment + Quiz)	
Total		100	

Reco	Recommended Reading material:				
1.	Todaro, M.P., Stephen C. Smith, Economic Development, Pearson Education, 2017				
2.	Thirwal, A.P., Economics of Development, Palgrave, 2011				
3.	Ahuja, H. L., Development Economics, S Chand publishing, 2016				
4.	Ray, Debraj, Development Economics, Oxford University Press, 2016				

Course Code		16B1NPH531   Semester: Odd		d Semester: V Session: 20 Month from Aug 2020 to			20 -2021 Dec 2020		
Course Name		Quantum Mechanics for Engineers							
Credits			3		Contact H	lours		3-1	-0
Faculty (N	ames)	Coordinato	r(s)	Anuraj Panwar					
		Teacher(s) (Alphabetica	ully)	Anuraj Panwar					
COURSE	OUTCO	OMES						COGNIT	IVE LEVELS
C301-10.1	Reme	ember basics of	f Quantı	um Mechanics an	nd its applic	cations.		Remembe	r level (C1)
C301-10.2	Expla Schrö	ain postulates o ödinger Equatio	of quanti on, Perti	um mechanics, I urbation theory a	Dirac notation of the second content of the	on,		Understan	d level (C2)
C301-10.3	Solve	e various proble ruct quantum c	ems rela vircuits u	ited to different of using quantum g	quantum sys ates.	stems and		Apply leve	el (C3)
C301-10.4	Analy estab infor	nalyse the results obtained for various physical systems and to stablish the advantages of some simple protocols of quantum formation processing.Analyze le			evel (C4)				
Module No.	Title o Modu	itle of the Topics in the Module			No. of Lectures for the module				
1.	Introdu	ntroduction Wave particle duality, quantum physics (Planck and Einstein's ideas of quantized light), postulates of quantum mechanics, time dependent and time independent Schrodinger equation, operators, probability theory, expectation values, and uncertainty principle and its implications no cloning applications					8		
2.	Measu Theory Applic	MeasurementMatrix and linear algebra, Eigen values and eigenfunctionsTheory withHilbert space, Kets, Bras and Operators, Bras Kets and Matrix representations, Measurements, Stern Gerlach Experiment, Observables and Uncertainity Relations, No- cloning theorem, Pauli Spin Matrices.			10				
3.	Potenti	Potential problems 1-D, 2-D, and 3-D potential problems (including infinite and finite square well). Tunneling, harmonic oscillator, separation in spherical polar coordinates, hydrogen atom, etc.),				08			
4.	Approx method	roximationTime independent perturbation theory for nondegeneratenodsand degenerate energy levels.			4				
5.	Advan Applic	vanced plications Kronig Penny model, Basic ideas of quantum computing, Qubit, Gate model of quantum computing : H, CNOT, Pauli Gates, BB84 protocol, Advantages of quantum computing, Quantum wire, Quantum dot and realization of CNOT using Quantum dot.				10			
					T	'otal num	ber of	Lectures	40

<b>Evaluation Criteria</b>	
Components	Maximum Marks
T1	20
T2	20
End Semester Examination	35
ТА	25 [2 Quiz (10 M), Attendance (10 M) and Cass performance (5 M)]
Total	100

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Reco Refe	<b>Recommended Reading material:</b> Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)				
1.	The new quantum universe by Toney Hey and Patrick Walters, Cambridge University Press.				
2.	Quantum mechanics a new introduction by Kenichi Konishi and G Paffuti, OUP., 2009				
3.	Quantum physics by Eyvind H Wichman (Berley Physics course Vol 4) Tata McGraw Hill 2008				
4.	Elements of quantum computation and quantum communication by A Pathak, CRC Press 2013.				
5.	Introduction to Quantum Mechanics by David J. Griffiths, Second Edition, Pearson, 2015.				

Course Code	16B1NPH533	Semester: Odd		Semester: VSession: 2020 - 2021Month from Aug 2020 to Dec 2020	
Course Name	Laser Technology an	nd Applications			
Credits	3		<b>Contact Hours</b>		3-1-0
Faculty (Names)	Coordinator(s)	Navneet Kumar Sharma and Anshu Varshney			Varshney
	Teacher(s) (Alphabetically)	Navneet Kumar Sharma and Anshu Varshney			

COURSE O	COGNITIVE LEVELS	
C301-12.1	Define the coherent properties, high brightness of laser, population inversion and optical feedback to laser technology	Remember Level (C1)
C301-12.2	Extend the knowledge of lasers in some applications like LIDAR, laser tracking, bar code scanner, lasers in medicine and lasers in industry	Understand Level (C2)
C301-12.3	Apply the optical ray transfer matrix to determine the stability of a laser resonator	Apply Level (C3)
C301-12.4	Distinguish the operational principles of CW, Q-switched, mode locked lasers; laser rate equations for three & four level lasers; different types of laser systems	Analyze Level (C4)

Module No.	Title of the Module	Topics in the Module	No. of Lectures for the module
1.	Fundamentals of Lasers	Laser idea and properties; Monochromaticity, directionality, brightness, Temporal and spatial Coherence. Interaction of radiation with matter; Absorption, spontaneous and stimulated emission of radiation, Rates equations, Einstein's A and B coefficients. Laser rate equations: Four level and three level systems. Conditions for producing laser action, population inversion, saturation intensity, threshold condition and gain optimization. Experimental techniques to characterize laser beam.	12
2.	Types of Lasers	Pumping processes; optical and electrical pumping. Optical Resonators; The quality factor, transverse and longitudinal mode selection; Q switching and Mode locking in lasers. Confocal, planar and spherical resonator systems. Types of Lasers; Solid state Lasers; Ruby Laser, Nd:YAG laser. Gas lasers; He-Ne laser, Argon laser, CO <sub>2</sub> , N <sub>2</sub> and Excimer Laser. Dye (liquid) Laser, Chemical laser (HF), Semiconductor Lasers; Heterostructure Lasers, Quantum well Lasers. Free electron laser, X-ray laser and Ultrafast Laser.	16
3.	Applications of Lasers	Image processing; Spatial frequency filtering and Holography, Laser induced fusion; Fusion reactor, creation of Plasma. Lightwave communications. Use in optical reader (CD player) and writer. Nonlinear optics; harmonic generation, self focusing. Lasers in industry; Material processing, Cutting, welding and whole drilling. Precision	12

		length measurement, velocity measurement, Laser Tracking, Metrology and LIDAR. Lasers in medicines and surgery. Lasers in defense, Lasers in space sciences, Lasers in sensors.			
		Total number of Lectures	40		
Evaluation	1 Criteria				
Componen	its	Maximum Marks			
T1		20			
T2		20			
End Semest	ter Examination	35			
ТА		25 [2 Quiz (10 M), Attendance (10 M) and Cass performance	e (5 M)]		
Total		100			
<b>Recommended Reading material:</b> Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)					
1 Thya	1 Thyagarajan and Ghatak, <i>Lasers Theory and Applications</i> , Macmilan India.				

1.	Thyagarajan and Onatak, Luser's Theory and Applications, Machinan India.
2.	W. T. Silfvast, Laser Fundmentals, Cambridge Univ-Press.
3.	O. Svelto, Principles of Lasers, Springer.
4.	Saleh and Teich, Fundamentals of Photonics, John Wiley & Sons.

Course Code	16B1NPH535	Semester: Odd		Semester: V Session: 2020 -2021 Month from Aug 2020 to Dec 2020		
Course Name	NUCLEAR SCIENC	CE AND ENGINEERING				
Credits	3 Contac		Contact <b>H</b>	Iours	3-1-0	
Faculty (Names)	Coordinator(s)	Manoj Tripathi				
	Teacher(s) (Alphabetically)	Manoj Tripathi				

COURSE O	COGNITIVE LEVELS	
C301-14.1	Relate terminology and concepts of nuclear science with various natural phenomenon and engineering applications.	Remember level (C1)
C301-14.2	Explain various nuclear phenomenon, nuclear models, mass spectrometers, nuclear detectors, particle accelerators. and classify elementary particles.	Understand level (C2)
C301-14.3	Solve mathematical problems for various nuclear phenomenon and nuclear devices.	Apply level (C3)
C301-14.4	Analyze the results obtained for various physical problems and draw inferences from the results.	Analyze level (C4)

Module No.	Title of the Module	Topics in the Module	No. of Lectures for the module
1.	Nuclear Constituents and their properties, Nuclear Forces	Rutherford scattering and estimation of nuclear size, Constituents of the nucleus and their properties, Nuclear Spin, Moments and statistics, Magnetic dipole moment, Electric quadruple moment. Nuclear forces, Two body problem - Ground state of deuteron, Central and non-central forces, Exchange forces: Meson theory, Yukawa potential, Nucleon-nucleon scattering, Low energy n-p scattering, Effective range theory, Spin dependence, charge independence and charge symmetry of nuclear forces, Isospin formalism.	07
2.	Nuclear Models	Binding energies of nuclei, Liquid drop model: Semi- empirical mass formula, Mass parabolas, Prediction of Nuclear stability, Bohr-Wheeler theory of fission, Shell model, Spin-orbit coupling. Magic numbers, Angular momenta and parities of nuclear ground state, Magnetic moments and Schmidt lines, Collective model of a nucleus.	05
3.	Nuclear decay and Nuclear reactions	Alpha decay, Beta decay, Pauli's Neutrino hypothesis- Helicity of neutrino, Theory of electron capture, Non- conservation of parity, Fermi's theory, Gamma decay: Internal conversion, Multipole transitions in nuclei, Nuclear isomerism, Artificial radioactivity, Nuclear reactions and conservation laws, Q-value equation, Centre of mass frame in nuclear Physics, Scattering and reaction cross sections, compound nucleus, Breit-Wigner one level formula	08

4.	Interaction of nuclear radiation with matter	Interaction of charge particles with matters: Bohr's ionization loss formula and estimation of charge, mass and energy. Interaction of electromagnetic radiation with matter, Linear absorption coefficient. Nuclear particle detectors and neutron counters.	07
5.	Accelerator and reactor Physics	Different types of reactors, tracer techniques, activation analysis. Radiation induced effects and their applications: Accelerators: Linear accelerators, Van de Graff generator, LINAC, Cyclotrons, Synchrotons, Colliders.	06
6.	Cosmic radiation and Elementary Particles	Cosmic radiation: Discovery of cosmic radiation, its sources and composition, Latitude effect, altitude effect and east- west asymmetry, secondary cosmic rays, cosmic ray shower, variation of cosmic intensity and Van Allen radiation belt. Elementary particles: Classification of particles, K-mesons, Hyperons, particles and antiparticles, fundamental interactions, conservation laws, CPT theorem,	07
		resonance particles and hypernucleus, Quark model.	
		resonance particles and hypernucleus, Quark model. Total number of Lectures	40
Evaluatior	n Criteria	resonance particles and hypernucleus, Quark model. Total number of Lectures	40
Evaluation Componen T1 T2 End Semes TA Total	n Criteria hts ter Examination	resonance particles and hypernucleus, Quark model. <b>Total number of Lectures</b> <b>Maximum Marks</b> 20 20 35 25 [2 Quiz (10 M), Attendance (7 M) and PBL & Cass perfor <b>100</b>	<b>40</b> mance (8 M)]
Evaluation Componen T1 T2 End Semes TA Total	Criteria Its ter Examination	resonance particles and hypernucleus, Quark model. <b>Total number of Lectures</b> <b>Maximum Marks</b> 20 20 35 25 [2 Quiz (10 M), Attendance (7 M) and PBL & Cass perfor 100 I: Author(s), Title, Edition, Publisher, Year of Publication ato	40 mance (8 M)]
Evaluation Componen T1 T2 End Semes TA Total Recommen Reference	n Criteria nts ter Examination nded Reading materia Books, Journals, Repor	resonance particles and hypernucleus, Quark model. <b>Total number of Lectures</b> <b>Maximum Marks</b> 20 20 35 25 [2 Quiz (10 M), Attendance (7 M) and PBL & Cass perfor 100 <b>d:</b> Author(s), Title, Edition, Publisher, Year of Publication etc. ts, Websites etc. in the IEEE format)	40 mance (8 M)] ( Text books,
Evaluation Componen T1 T2 End Semes TA Total Recommen Reference 1 1. K.S.	n Criteria Its ter Examination Inded Reading materia Books, Journals, Repor Krane, 1987, Introduct	resonance particles and hypernucleus, Quark model. Total number of Lectures Maximum Marks 20 20 35 25 [2 Quiz (10 M), Attendance (7 M) and PBL & Cass perfor 100 I: Author(s), Title, Edition, Publisher, Year of Publication etc. rts, Websites etc. in the IEEE format) cory Nuclear Physics, Wiley, New York.	40 mance (8 M)] ( Text books,

**3.** B.L. Cohen, 1971, Concepts of Nuclear Physics, TMH, New Delhi.

4. R.R. Roy and B.P. Nigam, 1983, Nuclear Physics, New Age International, New Delhi.

5. H.A. Enge, 1975, Introduction to Nuclear Physics, Addison Wesle, London.

6. Y.R. Waghmare, 1981, Introductory Nuclear Physics, Oxford-IBH, New Delhi.

7. R.D. Evans, 1955, Atomic Nucleus, McGraw-Hill, New York.

Course Code	17B1NHS531	Semester: Odd	đ	Semeste Month :	er: V Session: 2020 -2021 from Aug 2020 to Dec 2020
Course Name	Technology and Cult	ure			
Credits	Credits 3		Contact I	Hours	3-0-0
Faculty (Names)	Coordinator(s)	Dr Swati Sharr	na		
	Teacher(s) (Alphabetically)	Dr Swati Sharma			

COURSE	OUTCOMES	COGNITIVE LEVELS
C303-5.1	Understand the main theories in cultural management,	Apply level (C 2)
C303-5.2	Appraise technological convergence and cultural divergence, relate the differences to the literature and suggest solutions	Evaluate level (C 5)
C303-5.3	Interpret and communicate effectively in physical and virtual teams by evaluating appropriate concepts, logic and selecting the apt IT tools.	Evaluate level (C5)
C303-5.4	Evaluation of the theoretical knowledge to adapt to cultural differences in global work environment.	Evaluate level (C 5)

Module No.	Title of the Module	Topics in the Module	No. of Lectures for the module
1.	Introduction	<ul> <li>Genealogy of the concept</li> <li>The Information Technology Revolution</li> </ul>	7
2.	Dimensions of Culture	<ul> <li>The concept of Network societies</li> <li>Evolution of Culture</li> <li>Principal theories of Culture: Kluckholn and Strodtbeck, Hofstede, Trompenaars and Schwartz</li> <li>Cultural Diversity and cross cultural literacy</li> </ul>	12
3.	Cross cultural communication in physical and virtual teams	<ul> <li>The Communication Process</li> <li>Language and Culture</li> <li>Non Verbal Communication</li> <li>Barriers to Cross Cultural Understanding</li> </ul>	7
4.	Negotiation and Decision Making	<ul> <li>Theories of Negotiation</li> <li>Negotiation and Intercultural Communication</li> <li>Decision making in cross cultural environment</li> </ul>	8
5.	Cross Culture and Leadership	Leadership and Culture	8

		Theories of Culture centric leadership and their Global	
		Relevance	
		Developing Competencies for Global citizens	
		Women as International Leaders	
		Cross Cultural Training	
		Ethical Guidelines for Global Citizens	
	<u>~</u>	Total number of Lectures 4	12
Evaluation	n Criteria		
Componen	nts	Maximum Marks	
T1		20	
T2		20	
End Semes	ter Examination	35	
ТА		25 (Project and Oral Viva)	
Total		100	

**Recommended Reading material:** Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

1.	Cateora, P. R., Meyer, R. B. M. F., Gilly, M. C., & Graham, J. L. (2020). <i>International marketing</i> . McGraw-Hill Education.
2.	Coyle, D., The Culture Code: The Secrets of Highly Successful Groups, Bantam, 2018
3.	Fletcher, R., & Crawford, H. (2013). <i>International marketing: an Asia-Pacific perspective</i> . Pearson Higher Education AU.
4.	Gerard Bannon, J. (red.). Mattock, Cross-cultural Communication: The Essential Guide to International Business.2003
5.	Maidenhead.Riding the Waves of Culture: Understanding Cultural Diversity in Business (2012).3rd edition. McGraw Hill.
6.	Madhavan, S., Cross Cultural Management: Concepts and Cases(2 <sup>nd</sup> Ed),Oxfor University Press 2016.
7.	Robertson, Ronald. Globalization: Social theory and global culture, London: Sage, 1992.

Course Code	18B15CS212	Semester: Odd	Semester: V Session: 2020 -2021 Month from Aug 2020 to Dec 2020 (Due to COVID-19 pandemic, it was run in Fast Track mode from 2 June'21 to 21 June'21)
Course Name	Computer Networl	ks and Security Lab	
Credits	1	<b>Contact Hours</b>	0-0-2

Faculty (Names)	Coordinator(s)	Somya Jain, Dr. Kavita Pandey
	Teacher(s)	Dr. Kavita Pandey, Somya Jain

COURSE OUT	COGNITIVE LEVEL	
C370.1	Classify secure wired network technologies and basic building blocks in computer networks	Understand Level (Level 2)
C370.2	Visualize and analyze packets of Application, Transport and Network Layer communication and security protocols of TCP/IP Protocol Suite in Wireshark.	Apply Level (Level 3)
C370.3	Create UDP and TCP client server applications using socket programming. Develop and analyze code to implement symmetric key, asymmetric key cryptographic techniques and key exchange algorithms	Analyze Level (Level 4)
C370.4	Model a communication network and estimate the performance of the protocols at Network and Transport layer using simulator	Evaluate Level (Level 5)
C370.5	Apply routing algorithms and security techniques to solve real world problems	Create Level (Level 6)

Module No.	Subtitle of Module	Topics in the module	СО
1.	Introduction	Introduction to Computer Network devices / UNIX Commands for TCP/IP Protocol Suite	C370.1
2.	Wireshark Simulator	Capturing, study and analysis of Application Layer, Transport Layer and Network Layer packet communication (*.pcap) files and Security Protocols in	C370.2

3.	Socket Programming	UDP and TCP client server socket programming. Client server communication for symmetric key, asymmetric key cryptographic techniques and key exchange algorithms	C370.3
4.	Network Simulator (NS3)	Modeling of secure wired communication network and estimate the performance of the protocols at Network and Transport layer using simulator	C370.4
5.	Application Development	Apply routing algorithms and security techniques to solve real world problems	C370.5

<b>Evaluation</b> Criteria	
Components	Maximum Marks
Lab Test -1	20
Lab Test -2	20
Lab Evaluations	30
Project	15
Attendance	15
Total	100

Project based learning: The students are grouped into groups of size 2-3 and will be implementing a socket client server program with required encryption and security techniques. The student will analyse the requirements for the routing and security related problems and apply the selected techniques to solve real world problems. This will help in the employability of students in the information security or cyber security sector.

Text l	Books
1.	UNIX Network Programming, Volume 1, Second Edition: Networking APIs: Sockets and XTI, Prentice Hall, 1998, ISBN 0-13-490012-X.
2.	Anish Nath, "Packet Analysis with Wireshark Paperback," Packt Publishing
3.	Abhishek Ratan, et.al., Python Network Programming: Conquer all your networking challenges with the powerful Python language 1st Edition. 2019
4.	Teerawat Issariyakul, Ekram Hossain, "Introduction to Network Simulator NS2", Springer.
Refer	ence Books
5.	John Goerzen, Foundations of Python Network Programming: The comprehensive guide to building network applications with Python, 2nd ed. Edition, 2010
6.	W. Richard Stevens, TCP/IP Illustrated, Vol. 1: The Protocols (Addison-Wesley Professional Computing Series) 1st Edition, 1994
7.	Yoram Orzach, "Network Analysis Using Wireshark Cookbook," Packt Publishing
8.	NS3 Documentation, available at https://www.nsnam.org/documentation/
0	Behrouz A Forouzan, Debdeep Mukhopadhyay, "Cryptography & Network Security", Chennai
9.	Mc Graw Hill Education (India) Private Limited, Third edition, 2015
10.	William Stallings, "Cryptography and Network Security Principles and Practice", Pearson, Seventh Edition, 2017

Subject Code	19B12HS311	Semester: Odd	Semester: V Session: 2020-21				
			Month from Aug 2020 to Dec 2020				
Subject Name	ENTREPRENEURIAL	DEVELOPMENT					
Credits	3	Contact Hours	3-0-0				

Faculty	Coordinator(s)	Dr Badri Bajaj
(Names)	Teacher(s) (Alphabetically)	Dr Badri Bajaj

COURSE	OUTCOMES	COGNITIVE LEVELS
C303-8.1	Understand basic aspects of establishing a business in a competitive environment	Understand Level (C2)
C303-8.2	Apply the basic understanding to examine the existing business ventures	Apply Level (C3)
C303-8.3	Examine various business considerations such as marketing, financial and teaming etc.	Analyze Level (C4)
C303-8.4	Assessing strategies for planning a business venture	Evaluate Level (C5)

Module No.	Subtitle of the Module	Topics in the module	No. of Lectures for the module
1.	Entrepreneurial perspective	Foundation, Nature and development of entrepreneurship, importance of entrepreneurs, Entrepreneurial Mind, Individual entrepreneur Types of entrepreneurs	6
2.	Beginning Considerations	Creativity and developing business ideas; Legal issues; Creating and starting the venture; Building a competitive advantage	10
3.	Developing Marketing Plans	Developing a powerful Marketing Plan, E- commerce, Integrated Marketing Communications	8
4.	Developing Financial Plans	Sources of Funds, Managing Cash Flow, Creating a successful Financial Plan Developing a business plan	10
5.	Leading Considerations	Developing Team, Leading the growing company, Resources for growth	8
Total numbe	er of Lectures		42
		Evaluation Criteria	
Components T1 T2 End Semester TA	Maximum 20 20 r Examination 35 25 (Assis	n Marks	

**Recommended Reading material:** Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

100

Total

1.	Robert D Hisrich, Michael P Peters & Dean A Shepherd, "Entrepreneurship" 10 <sup>th</sup> Edition, McGraw Hill Education, 2018
2.	Norman M. Scarborough and Jeffery R. cornwell, "Essentials of entrepreneurship and small business management" 8th Edition, Pearson, 2016
3.	Rajiv Roy, "Entrepreneurship", 2 <sup>nd</sup> Edition, Oxford University Press, 2011
4.	Sangeeta Sharma, "Entrepreneurship Development", 1st Edition, Prentice-Hall India, 2016

(				Lecture v	ist Di cant	<u>.</u>			
Course Code		20B12CS331		Semester: Od	d	Semester: V Month from		Session: 2020-2021 Aug 2020 to Dec 2020	
Course Name Fundamental		s of Machine Learning							
Credits	Credits 3-0-0 Contact Hours 3					;			
Faculty (N	ames)	Coordinato	r(s)	Bharat Gupta					
		Teacher(s) (Alphabetica	ally)	lly) Bharat Gupta, Dhanalekshmi G, Shikha Mehta					
COURSE	ουτο	OMES						COGNIT	IVE LEVELS
C330-1.1	Unders approa	stand the n ches.	nathema	tical concepts	of macl	hine lea	rning	Understan	d Level (C2)
C330-1.2	Apply machin	the fundament ne learning pro	tals of li blems.	near algebra and	l probabilit	y theory t	to the	Apply Lev	vel (C3)
C330-1.3	Apply machin	the concepts one learning mo	of regre dels.	ssion analysis a	nd vector o	calculus t	o the	Apply Lev	vel (C3)
C330-1.4	Analyz machin	e the role of di e learning prob	imension olems	nality reduction	and density	estimatio	on for	Analyze L	Level (C4)
C330-1.5	Evaluate and test the significance of machine learning results Evaluate statistically.						Evaluate I	Level (C5)	
Module No.	Title o Modu	Title of the ModuleTopics in the Module					No. of Lectures for the module		
1.	Introduction to Why Machine learning learning learning			machine learning, learning problems, types of ing: supervised, unsupervised, semi-supervised ing, fundamentals of machine learning			types of supervised	02	
2.	Linear Algebra Linear equations, solving linear equations, matrices, Cholesky Decomposition, singular value decomposition, matrix approximation, vector space, Norms, inner product, length and distances, angles and orthogonality, orthogonal complement, inner product, orthogonal projections and rotations, linear independence, linear mapping, Affine spaces					matrices, nposition, r product, orthogonal tions and g, Affine	09		
3.	Probability Theory         Discrete and continuous probability, sum rule, product rule, Baye's Theorem, Gaussian Estimation, conjugacy and exponential family, inverse transform, Hidden Markov model					05			
4.	Regress Analys	sion sis	Proble regress multiv logistic	lem formulation, parameter estimation, linear ssion vs non-linear regression models, univariate vs ivariate regression, regression using least squares, tic regression in machine learning			05		
5.	Vector	Calculus	Gradie learnin automa taylor	ents of vector valued function, gradient descent 07 ng, lagrange's function in supervised learning, natic differentiation, linearization and multivariate			07		
6.	Dimen Reduct Densit	sionality tion and v Estimation	Maxim LDA, estima	um variance, Low rank approximation, PCA, ICA, 08 latent Variable, GMM, Maximum Likelihood			08		

7	Statistical Validations	T test, paired T test, Z test, hypothesis testing, ANOVA, Pearson coefficient, significance testing	06
		Total number of Lectures	42
Evaluation	n Criteria		
Componer	nts	Maximum Marks	
T1		20	
T2		20	
End Semes	ster Examination	35	
TA		25 (Attendance (10), Quiz/ Assignments in PBL mode/etc (15	5))
Total		100	

**Recommended Reading material:** Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

	Text Books:
1.	Goodfellow, Ian, Yoshua Bengio, and Aaron Courville. Deep learning. MIT press, 2016.
2.	Deisenroth, Marc Peter, A. Aldo Faisal, and Cheng Soon Ong. Mathematics for machine learning. Cambridge University Press, 2020.
	Reference Books:
1.	Mitchell, Tom M. "Machine learning." (1997).
2.	Bishop, Christopher M. Pattern recognition and machine learning. springer, 2006.
3.	Hastie, Trevor, Robert Tibshirani, and Jerome Friedman. <i>The elements of statistical learning: data mining, inference, and prediction.</i> Springer Science & Business Media, 2009.

<u>Detailed Syllabus</u> Lecture-wise Breakup							
Subject Co	ode	20B12CS332 S		emester: Odd	Semester: V Session: 2020 -2021		
					Month from Aug 2020 to Dec 2020		
Subject Na	ame	Fundamentals o	f C	omputer Security			
Credits		3	C	Contact Hours		3-0-0	
Foculty		Coordinator(s)		Dr. Charu Gandhi(128)	Dr. Dowon Singh M	Johna (62)	
(Names)	Ļ	Coordinator(s)		DI. Charu Ganuni (128),	DI. Fawan Shigh M		
(italics)	Teacher(s)		Dr. Charu Gandhi, Dr. Pawan Singh Mehra				
		(Alphabetically)					
COURSE	OUT	COMES				COGNITIVE LEVELS	
C330-2.1	Expl type:	ain the fundamenta	al c	oncepts of computer sector	urity and malware	Remember Level (C1)	
C330-2.2 Identify t cryptosyst		tify types of crypt tosystems	y types of cryptographic techniques and working of classical ystems			Understand Level (C2)	
C330-2.3	2.3 Describe authentication and access control paradigms Understand Level (C2					Understand Level (C2)	
C330-2.4	Apply proactive solutions to security like Firewalls and IDS Apply Level (C3)						
C330-2.5	Describe legal and ethical issues with respect to information security Understand Level (C2)						

Module No.	Subtitle of the Module	Topics in the Module	No. of Lectures for the module
1.	Security Basics	General overview, terminology and definitions, Security models and policy issues	6
2.	Introduction to Malware	Introduction to Malicious code, Spyware, Ransomware, Logic Bombs, Virus, Bacteria and Worms, Introduction to Anti- malware technology	6
3.	Threats to Network Communications and Basic Cryptography	Threats to Network Communications, Interception: Eavesdropping and Wiretapping, Modification, Fabrication: Data Corruption, Interruption: Loss of Service, Port Scanning, Introduction to cryptography and classical cryptosystem, Steganography vs Cryptography	8
4.	Authentication	Identification Versus Authentication, Authentication Based on Something You Know, Something You Are, Something You Have, Federated Identity Management, Multifactor Authentication, Secure Authentication, Password policies	5
4.	Access Control	Access Policies, Implementing Access Control, Procedure- Oriented Access Control, Role-Based Access Control, Captchas	5
5.	Intrusion Detection and Response	Goals for Intrusion Detection Systems, Types of IDSs – Anomaly Based and Signature Based ,Intrusion Prevention Systems, Intrusion Response	5
6.	Firewalls	What Is a Firewall?, Design of Firewalls, Types of Firewalls, Personal Firewalls, Comparison of Firewall Types, Example Firewall Configurations	3

6		<u> </u>	
		Network Address Translation (NAT), Data Loss Prevention	
7.		Protecting Programs and Data - Copyrights, Patents, Trade	
ľ .	Legal and Ethical	Secrets, Information and the Law - Information as an Object,	
	Issues	Legal Issues Relating to Information, Protection for Computer	4
		Artifacts,	
		Ethical Issues in Computer Security	
		Total number of Lectures	42
Eval	uation Criteria		
Com	ponents	Maximum Marks	
T1	•	20	
T2		20	
End	Semester Examination	35	
TA		25 (Attendance-07, Class Test/ Quiz-07, Internal assessment-05,	,
		Assignment-06)	
Tota	1	100	
Reco Refe	ommended Reading mate rence Books, Journals, Re	erial: Author(s), Title, Edition, Publisher, Year of Publication etc. (Tports, Websites etc. in the IEEE format)	ext books,
	Text Books:		
1.	Security in Computing (:	5th edition), Pfleeger, Pfleeger and Margulies, Pearson.	
2.	Computer Security: Art	and Science by Matt Bishop, Addison-Wesley Educational Publisher	s Inc
	Reference Books:		
1.	Computer Security Fund	amentals, (4th Edition), Chuck Easttum, Pearson Ed.	
2.	Foundations of Computer Security, David Salomon, Springer		
3.	Introduction to Modern Cryptography (2nd edition), Katz and Lindell, Chapman & Hall/CRC		
4.	Elements of Computer S	ecurity, David Salomon, Springer	
5.	Cryptography Theory and Practice (3rd edition), Stinson, Chapman & Hall/CRC		

Course Code	e	20B12CS333	Semester: OddSemester: VSession: 2020 -2021Month from Aug 2020 to Dec 2020		Session: 2020 -2021 Aug 2020 to Dec 2020		
Course Name		Introduction to Big D	Data & Data Ana	lytics			
Credits		3	Contact Hours		3-1-0		
			1				
Faculty (Names)		Coordinator(s)	Dr. Megha Rathi (62), Dr. Payal Khurana Batra (128)				
		Teacher(s) (Alphabetically)	Dr. Megha Rathi, Dr. Payal Khurana Batra			1	
		•					
COURSE OUTCO		DMES					COGNITIVE LEVELS
C330-3.1 Exidat		ain the fundamental co analytics	concepts of an exciting growing field of big Understand		Understanding [Level 2]		
	Dem	onstrate the tools rea	uired to manage	and analyz	e hig dat	a like	

C330-3.2	Hadoop, NoSql MapReduce	Apply [Level 3]
C330-3.3	Apply predictive models and advanced computing paradigms for big data analytics	Apply [Level 3]
C330-3.4	Analyze the big data using intelligent & visualization techniques and use various techniques for mining data stream	Analyze [Level 5]
C330-3.5	Design and create predictive and mathematical model to solve complex real-world problems in for decision support.	Create [Level 6]

Module No.	Title of the Module	Topics in the Module	No. of Lectures for the module
1.	Introduction to Big Data	Introduction to Big Data landscape, Big Data: Why and where, Characteristics of Big Data (V's of Big Data (volume, velocity, variety, veracity, valence, and value) and Dimensions of Scalability, Data Models for Big Data Products(NOSQL, NEWSQL,HADOOP),Data Science and Analytics.	7
2.	Data Visualization Techniques	Introduction to Python or R, Understanding and Visualizing Data, Data Visualization R/Python	5
3.	Data Modeling and Optimization	Modeling Uncertainty and Risk, Optimization and Modeling Simultaneous Decisions, Case Study	5
4.	Decision Making and Predictive Analytics-1	Data exploration, Evaluation methods, Regression Techniques, Classification Techniques, Case Study	9
5.	Decision Making and Predictive Analytics-2	Clustering Techniques, Anomaly Detection, Dimensionality Reduction, Neural networks for deep learning, Hands-on using Python/R, Case Study	9
6.	Big Data Technologies	Using Hadoop to store data(HDFS, HBASE), Process Data using Map Reduce, Testing and Debugging Map Reduce Applications	7

			Total num	ber of Lectures	42
Eval	Evaluation Criteria				
Com	Components Maximum Marks				
T1	T1 20				
T2	T2 20				
Enc	End Semester Examination 35				
TA			25 (Attendance-07, Class Test/ Quizze-07, In	nternal assessmer	nt-05,
			Assignments-06)		
Tota	1		100		
Reco Refe	ommended F rence Books,	Reading materia , Journals, Repor	: Author(s), Title, Edition, Publisher, Year o s, Websites etc. in the IEEE format)	of Publication etc.	( Text books,
Refe	rence Books	5:			
1.	Dey, N., Hassanien, A. E., Bhatt, C., Ashour, A., & Satapathy, S. C. (Eds.). (2018). Internet of things and big data analytics toward next-generation intelligence (pp. 3-549). Berlin: Springer.				
2.	Marz, N., & Warren, J. (2015). Big Data: Principles and best practices of scalable real time data systems. Manning Publications Co.				
3.	Grover, M., Malaska, T., Seidman, J., & Shapira, G. (2015). Hadoop Application Architectures: Designing Real-World Big Data Applications. " O'Reilly Media, Inc.".				
4.	Covington, D. (2016). Analytics: Data Science, Data Analysis, and Predictive Analytics for Business. CreateSpace Independent Publishing Platform.				
Text	Books:				
5.	EMC Education Services. (2015). Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data. Wiley.			ing, Analyzing,	
6.	Nelli, F. (2018). Python data analytics: with pandas, numpy, and matplotlib. Apress.				
7.	Sedkaoui, S. (2018). Data analytics and big data. John Wiley & Sons.				
8.	Erl, T., Khattak, W., & Buhler, P. (2016). Big data fundamentals: concepts, drivers & techniques. Prentice Hall Press.				
9.	Dasgupta, 1 and machin	N. (2018). Practi le learning using	Il big data analytics: Hands-on techniques to Iadoop, Spark, NoSQL and R. Packt Publish	) implement enter 11ng Ltd.	prise analytics
10.	Kumar, V. N., & Shindgikar, P. (2018). Modern Big Data processing with Hadoop: Expert techniques for architecting end-to-end Big Data solutions to get valuable insights. Packt Publishing Ltd.				

Lecture-wise Breakup				
Course Code20B12CS334Semester: OddSemester: I Session: 2020-21		Semester: I Session: 2020-21		
			Month from Aug 2020 to Dec 2020	
Course Name	Course Name Object-Oriented Analysis and Design using JAVA			
Credits	Credits 3 Contact Hours 3-0-1		3-0-1	

<u>Detailed Syllabus</u>	
Lecture-wise Breakup	)

Faculty	Coordinator(s)	Dr. Amarjeet Prajapati (Sec-62), Dr. Himanshu Mittal (Sec-128)
(Names)	Teacher(s) (Alphabetically)	Dr. Amarjeet Prajapati, Dr. Himanshu Mittal

COURSE	OUTCOMES	COGNITIVE LEVELS
C330-4.1	Illustrate Object Oriented Design and convert it to its code using JAVA Programming language.	Understand (Level 2)
C330-4.2 Dissect the requirements to identify the potential use cases, classes and objects in the system		Analyze (Level 4)
C330-4.3	Build UML diagrams such as class diagram, object diagram for structural modelling and state chart diagram, sequence diagrams for behavioral modelling.	Apply (Level 3)
C330-4.4	Create solutions to solve real world problems. using object oriented analysis and design principles.	Apply (Level 3)
C330-4.5	Estimate the complexity of object-oriented designs using several metrics.	Evaluate (Level 5)

Module No.	Title of the Module	Topics in the Module	No. of Lectures for the module
1.	Introduction	Programming Paradigms, Introduction to Object Oriented Paradigm, Principles of Object Orientation, Software Complexity: Benefits and Understanding the challenges OOAD can address, Overview of Software Development Life Cycle (SDLC) & Rational Unified Process (RUP), Object-Oriented Requirements Elicitation & Analysis and Systems Behavior, Quality Attributes, Software Architect and Design Roles in Industry, Conceptual and Technical Designs, Competing Qualities and Trade-offs, Record, Organize, and Refine Components	4
2.	Object Oriented Analysis	Identifying Classes and Objects, Responsibilities, Relationships in problem domain, Object Model, Methods of Class Identification, Listing nouns and Verbs, Synonyms, Attributes and Methods	8
3.	Object Oriented analysis with UML	UML structure: Overview of static and dynamic UML diagrams, Modeling System Behavior with	8

Total		100	
Evaluation CriteriaComponentsMaximum MarksT120T220End Semester Examination35TA25 ( Attendance = 05, Assignments/quizzes/tutorials = 08, Mini Project/PBL = 12)Tatal100			= 08, Mini
	۲ <u>ــــــــــــــــــــــــــــــــــــ</u>	Total number of Lectures	42
6.	OO Design Metrics	Understanding and Analyzing Software Design Metrics for Object Oriented Software.	6
5.	Design Principles	SOLID principles, Cohesion, Coupling, techniques for good Object Oriented design, separation of concerns, information hiding, and conceptual integrity	6
4.	Converting Design to Code in JAVA	Objects and Classes in JAVA, Implementing various relationships in JAVA- Association, Inheritance, generalization, Abstraction in Java, Method Overriding and Overloading, Object Roles, Class Types, Implementing Polymorphism, Extensibility and UML, Generalization with Interfaces and Packages in Java	10
		use case diagram and notations, From Use Cases to Functional Requirements, Elements of object and class diagram with notations: object, class, link, association, multiplicity, link attributes, association end names, association classes, qualified association, association ends, N-ray association, aggregation and composition, generalization, abstract class, Sequence & Collaboration diagram with notations, Object Collaborations, Interaction Diagrams, State Diagram - Event ,Change Event, Signal Event, Call Event, Time Event , States, Transition & Conditions, Transition, Guard Condition, Action, State Diagram, State Diagram Behaviour, Activity, Do-activity, Entry Activity, Exit Activity, Nested State Diagram, Nested States, Signal Generalization, Concurrency, Activity and Swim lane diagram, Elements of Component and deployment Diagram Object Constraint Language(OCL)	

#### **Recommended Reading material:**

Reference Books				
1.	Head First Object-Oriented Analysis and Design A Brain Friendly Guide to OOA&D By			
	Brett McLaughlin, Gary Pollice, David West 2011			

2.	An Introduction to Programming and Object-Oriented Design with Java by Frederick A.
	Hosch Jaime Nino
	2009
3.	OBJECT-ORIENTED ANALYSIS AND DESIGN With applications Third EDITION
	Grady Booch Rational
	Santa Clara, California 2009
Text Boo	ks
1.	Object Oriented Modeling And Design With UML 2nd Edition by MICHAEL BLAHA and
	JAMES RUMBAUGH, PEARSON INDIA 2013
2.	UML 2 AND THE UNIFIED PROCESS: Practical Object-oriented Analysis and Design
	2nd Editon by Jim Arlow, Pearson 2015
3.	The Object-Oriented Thought Process: Object Or Thought Process by Matt Weisfeld 2013

Course Code	20B12CS335	Semester: OddSemester: VSession: 2020 - 2021Month from: Aug 2020 to Dec 2020			
Course Name	Image Processing and	Computer Vision			
Credits	3	Contact Hours 3-0-0			
Faculty (Names)	Coordinator(s)	Dr. Aparajita N	Vanda		
	Teacher(s) (Alphabetically)	Dr. Aparajita Nanda			

COURSE At the com	<b>OUTCOMES</b> pletion of the course, Students will be able to	COGNITIVE LEVELS
C330-5.1	Understand the basic concepts of image processing and computer vision	Understand Level (C2)
C330-5.2	Apply different methods for intensity transformation, binary image processing and Fourier transformation	Apply Level (C3)
C330-5.3	Apply different spatial and spectral domain filters for image enhancements	Apply Level (C3)
C330-5.4	Apply thresholding, edge-based and region-based techniques for image segmentation	Apply Level (C3)
C330-5.5	Apply image processing techniques for various computer vision tasks	Apply Level (C3)

Module No.	Title of the Module	Topics in the Module	No. of Lectures for the module
1.	Fundamentals of Digital Image Processing and Computer Vision	Introduction to Computer Vision and Image Processing, Image geometry, Fundamental steps in Digital Image Processing, Applications with examples of Imaging Modalities, Elements of Visual Perception, Image Sensing and Acquisition, Sampling and Quantization, Basic Relationships Between Pixels	5
2.	Basic Mathematical Tools for Intensity Transformations	Elementwise versus Matrix Operations, Linear versus Nonlinear Operations, Arithmetic Operations, Set and Logical Operations, Spatial Operations, Vector and Matrix Operations, Image Transforms, Probability and Random Variables, Image Negatives, Log Transformations, Power-Law (Gamma) Transformations, Piecewise Linear Transformation Functions, Histogram Processing	5
3.	Binary Image Processing	Formation of Binary Image, Thresholding, Geometric properties, Projections, Run length encoding, Binary algorithms, Morphological operators	4
4.	Spatial Filtering	Mechanics of Linear Spatial Filtering, Spatial Correlation and Convolution, Separable Filter Kernels, Smoothing (Lowpass) Spatial Filters, Sharpening (Highpass) Spatial Filters, Highpass, Bandreject, and Bandpass Filters from Lowpass Filters, Combining Spatial Enhancement Methods	5
5.	Sampling and Fourier Transformation	Complex Numbers, Fourier Series, Impulses and their Sifting Properties, The Fourier Transform of Functions of One Continuous Variable, Convolution, The Fourier Transform of Sampled Functions, The Sampling Theorem, Aliasing, Function Reconstruction (Recovery) from Sampled Data, Discrete Fourier Transform of One Variable and two variables, Properties of the 2-D DFT and IDFT, The Fast Fourier	4

		Transform	
6.	Frequency Domain Filtering	Basics of Filtering in the Frequency Domain, Image Smoothing Using Lowpass Frequency Domain Filters, Image Sharpening Using Highpass Filters, Selective Filtering	3
7.	Image Segmentation	Point, Line, and Edge Detection, Image Gradient and Its Properties, The Canny Edge Detector, Local Processing and Global Processing Using Hough Transform, Basic Global Thresholding, Optimum Global Thresholding Using Otsu's Method, Segmentation by Region Growing and by Region Splitting and Merging.	6
8.	Computer Vision Applications	Case Studies like OCR, Scene understanding, Gesture recognition etc. using basic image processing techniques.	10
		Total number of Lectures	42
Eval	luation Criteria		
Com	ponents	Maximum Marks	
T1	- <b>F</b>	20	
T2		20	
End	Semester Examination	35	
TA		25 (Attendance-07, Class Test/ Quizze-07, Internal assessm	nent-05,
Tota	J	Assignments-06)	
	ļ1	100	
Text	Books:		
Text	Books: Digital Image Processir	ng 4th Edition by Rafael C Gonzalez, PEARSON INDIA, May 2018	3.

Refe	erence Books:
1.	Computer Vision: Algorithms and Applications by Richard Szeliski, Springer, 2010.
2.	Machine Vision by Ramesh Jain, Rangachar Kasturi, Brian G. Schunck, McGraw-Hill, Inc., ISBN 0-07-032018-7, 1995

Course Code	20B13HS311	ł	Semester: V Session: 2020-21		
				Month	from Aug 2020 to Dec 2020
Course Name	Indian Constitution and Traditional Knowledge				
Credits	3	Contact Hours 3-0-0			
Faculty (Names)	Coordinator(s)	Dr. Chandrima Chaudhuri			
	Teacher(s) (Alphabetically)	Dr. Chandrima Chaudhuri, Dr. Praveen Sharma, Dr. Santosh Dev, Ms. Shikha Kumari, Dr. Swati Sharma			

COURSE	OUTCOMES	COGNITIVE LEVELS
C305.1	Demonstrate an understanding about the early Indian traditional political thought and the current Indian political scenario by knowing about the structure of government in place	Understand level (C2)
C305.2	Demonstrate an understanding of the role of Indian President, Prime Minister, Governor, other members of the legislature and local governments as representatives of the common masses	Understand level (C2)
C305.3	Analyze the working of Indian federalism with reference to centre-state relations	Analyze level (C4)
C305.4	Analyze the impact of the contemporary challenges such as caste and gender to the working of Indian democracy	Analyze level (C4)

Module No.	Title of the Module	Topics in the Module	No. of Lectures for the module
1.	The Indian Constitution	<ul> <li>Historical Background to the Indian Constitution</li> <li>Salient features of the Indian Constitution</li> <li>Fundamental Rights (Part III of the Indian Constitution)</li> <li>Fundamental Duties (Part IVA of the Indian Constitution)</li> <li>Directive Principles of the State Policy (Part IV of the Indian Constitution)</li> </ul>	8
2.	Organs of the Government	<ul> <li>The Executive: President, Prime Minister and Governor- appointment, powers and functions</li> <li>The Legislature: Parliament and its components- Lok Sabha and Rajya Sabha (composition and functions)</li> <li>The Judiciary: Supreme Court-composition, functions, appointment and jurisdiction</li> </ul>	8

3.	Nature of Federalism in India	<ul> <li>Centre-State Legislative Relations</li> <li>Centre-State Administrative Relations</li> <li>Centre-State Financial Relations</li> <li>Special Provisions of some state and the 5<sup>th</sup> and 6<sup>th</sup> schedule</li> </ul>	8
4.	Local Governance in India	<ul> <li>Urban local governance: Municipality- Structure &amp; Functions</li> <li>Rural Local governance: Panchayat- Organization and Powers</li> <li>Civil Society: the participation of the people in local governance</li> </ul>	8
5.	Traditional knowledge	<ul> <li>Kautilya- Theory of state</li> <li>Mandala theory</li> <li>Saptanga theory</li> </ul>	6
6.	Challenges to Indian Democracy	<ul> <li>Caste as a critical factor in the Indian Constitution</li> <li>Gender as critical to the process of Constutionalization</li> </ul>	4
		Total number of Leatures	42
		Total number of Lectures	42
Evalua Compo T1 T2 End Se TA Total	ation Criteria onents N emester Examination	Iaximum Marks       20       20       35       25 (Attendance, Quiz, Project)       100	42
Evalua Compo T1 T2 End Se TA Total Recom Refere	ation Criteria onents N emester Examination mended Reading material nce Books, Journals, Reports	Initial number of Lectures         Initial number of Lectures         Initial number of Lectures         20         20         35         25 (Attendance, Quiz, Project)         100         : Author(s), Title, Edition, Publisher, Year of Publication etc.         s, Websites etc. in the IEEE format)	( Text books,
Evalua Compo T1 T2 End Se TA Total Recom Refere 1.	ation Criteria onents M emester Examination mended Reading material nce Books, Journals, Reports A.A. George, <i>Important Ju</i>	Initial number of Lectures         Maximum Marks         20         20         35         25 (Attendance, Quiz, Project)         100         author(s), Title, Edition, Publisher, Year of Publication etc.         s, Websites etc. in the IEEE format)         dgements that transformed India, New Delhi: McGraw Hill, 2	( Text books,
Evalua Compo T1 T2 End Se TA Total Recom Refere 1. 2.	ation Criteria onents M emester Examination mended Reading material nce Books, Journals, Reports A.A. George, <i>Important Jua</i> B. Chakraborty, <i>Indian Co</i> 2017	Initial number of Lectures         Maximum Marks         20         35         25 (Attendance, Quiz, Project)         100         : Author(s), Title, Edition, Publisher, Year of Publication etc.         s, Websites etc. in the IEEE format)         dgements that transformed India, New Delhi: McGraw Hill, 2         onstitution: Text, Context and Interpretation, New Delhi: S	42 ( Text books, 2020 Sage Publications,
Evalua Compo T1 T2 End Se TA Total Recom Refere 1. 2. 3.	ation CriteriaonentsMomentsMemester Examinationomended Reading materialnce Books, Journals, ReportsA.A. George, Important JudB. Chakraborty, Indian Co2017B.K.Sharma, Introduction t	Initial number of Lectures         Initial number of Lectures         Initial number of Lectures         20         20         35         25 (Attendance, Quiz, Project)         100         Ration (s), Title, Edition, Publisher, Year of Publication etc.         s, Websites etc. in the IEEE format)         dgements that transformed India, New Delhi: McGraw Hill, 2         onstitution: Text, Context and Interpretation, New Delhi: S         o the Constitution of India, New Delhi: Prentice Hall of India	42 ( Text books, 2020 Sage Publications, , 2002
Evalua Compo T1 T2 End Se TA Total Recom Refere 1. 2. 3. 4.	ation Criteria         onents       M         emester Examination         omended Reading material         nce Books, Journals, Reports         A.A. George, Important Jud         B. Chakraborty, Indian Ca         2017         B.K.Sharma, Introduction t         M.Laxmikanth, Indian Poli	Initial number of Lectures         In	42 ( Text books, 2020 Sage Publications, , 2002
Evalua Compo T1 T2 End Se TA Total Recom Refere 1. 2. 3. 4. 5.	ation Criteria         onents       M         emester Examination         omended Reading material         nce Books, Journals, Reports         A.A. George, Important Jule         B. Chakraborty, Indian Co         2017         B.K.Sharma, Introduction t         M.Laxmikanth, Indian Polit         M.P.Singh and R. Saxena         Learning, 2008	Iaximum Marks         20         35         25 (Attendance, Quiz, Project)         100         a Author(s), Title, Edition, Publisher, Year of Publication etc.         b, Websites etc. in the IEEE format)         dgements that transformed India, New Delhi: McGraw Hill, 2         constitution: Text, Context and Interpretation, New Delhi: S         o the Constitution of India, New Delhi: Prentice Hall of India         ty, 6 <sup>th</sup> edition, Noida: McGraw Hill, 2019         , R, Indian Politics: Contemporary Issues and Concerns,	42 ( Text books, 2020 Sage Publications, , 2002 New Delhi: PHI