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Shri Vaishnav Institute of Forensic Science

Choice Based Credit System (CBCS) in Light of NEP-2020
M.Sc. Cyber Forensics - III SEMESTER

MSCFN301 MOBILE SECURITY & FORENSICS

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
MSCFN301	Compulsory	Mobile Security & Forensics	60	20	20	30	20	3	0	2	4

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical;   C - Credit; Th. - Theory
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Course Objectives -:
1. Gain in-depth knowledge on wireless and mobile network security and its relation to the new security-based protocols.
2. Apply proactive and defensive measures to counter potential threats, attacks and intrusions.
3. Design secured wireless and mobile networks that optimize accessibility whilst minimizing vulnerability to security risks

Course Outcomes -:
After studying this paper student will be able
1. The course deals with the security and privacy problems in the realm of wireless networks and mobile computing.
2. The subject is useful to researchers working in the fields of mobile and wireless security and privacy and to graduate students seeking new areas to perform research.

UNIT I Overview of Wireless Technologies and Security-I
Personal Area Networks, Wireless Local Area Networks, Metropolitan Area Networks, Wide Area Networks. Wireless threats, vulnerabilities and security: Wireless LANs, War Driving, War Chalking, War Flying, Common Wi-fi security recommendations, PDA Security, Cell Phones and Security, Wireless DoS attacks, GPS Jamming, Identity theft

UNIT II Overview of Wireless Technologies and Security-II
CIA triad in mobile phones-Voice, SMS and Identification data interception in GSM: Introduction, practical setup and tools, implementation- Software and Hardware Mobile phone tricks: Netmonitor, GSM network service codes, mobile phone codes, catalog tricks and AT command set- SMS security issues

UNIT III Mobile Phone Forensics
Mobile phone forensics: crime and mobile phones, evidences, forensic procedures, files present in SIM card, device data, external memory dump, evidences in memory card,

operators systems- Android forensics: Procedures for handling an android device, imaging android USB mass storage devices, logical and physical techniques

UNIT IV Mobile Security-1
Introduction To Mobile Network Techs, Vulnerabilities Threats And Attack Entry Points. Categorization Of Attacks In Mobile Networks, Signaling Attacks.

UNIT IV Mobile Security-II
 Threats And Attacks In 4g Networks- Attacks Against Security And Confidentiality, Ip-Based Attacks, Gtp-Based Attacks, Volte Sip-Based Attacks, Diameter-Based Attacks

Experiments

1. Mobile Phone Acquisition (2 Nos.)
2. SIM Analysis (2 Nos)
3. To acquire mobile cache memory image using forensic tool (2 Nos.)
4. To perform mobile memory forensics practical using Magnet Forensics Tool (2 Nos)

Reference Books-:

1. Gregory Kipper, "Wireless Crime and Forensic Investigation", Auerbach Publications, 2007
2. Iosif I. Androulidakis, " Mobile phone security and forensics: A practical approach", Springer publications, 2012
3. Andrew Hoog, " Android Forensics: Investigation, Analysis and Mobile Security for Google Android", Elsevier publications, 2011
4. Angus M.Marshall, " Digital forensics: Digital evidence in criminal investigation", John – Wiley and Sons, 2008
5. Kia Makki, Peter Reiher, "Mobile and Wireless Network Security and Privacy ", Springer, ISBN 978-0-387-71057-0, 2007.
6. Siva Ram Murthy.C, Manoj B.S, "Adhoc Wireless Networks Architectures and By Yulong Zou, Senior Member IEEE, Jia Zhu, Xianbin Wang, Senior Member IEEE, and Lajos Hanzo, Fellow IEEE
7. "A Survey on Wireless Security: Technical Challenges, Recent Advances, and Future Trends" Zou et al.: A Survey on Wireless Security: Technical Challenges, Recent Advances, and Future Trends

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MSCFN302 DIGITAL IMAGE PROCESSING

COURSE CODE	CATEGORY	COURSE NAME	THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
MSCFN302	Compulsory	Digital Image Processing	60	20	20	0	0	3	0	0	3

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical;   **C** - Credit;
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Course Educational Objectives (CEOs):
1. To understand the fundamentals of digital image processing.
2. To create awareness about various types of Image transform used in digital image processing.
3. To give knowledge about the different types of Image enhancement techniques used in digital image processing.
4. Aware of the Image compression and Segmentation used in digital image processing.

Course Outcomes (COs):
Student will be able to:
1. Understand origin and use of digital image processing.
2. Explain the image fundamentals and mathematical transforms necessary for image processing.
3. Apply the image enhancement, compression, and restoration techniques.
4. Implement the image segmentation and representation techniques.

UNIT I
Elements of Visual Perception, Image Sensing and Acquisition, Image Sampling and Quantization, Relationships between pixels. Image Transforms: 2-D FFT, Properties. Walsh transform, Hadamard Transform, Discrete cosine Transform, Haar transform, K-L Transform.

UNIT II
Gray level transformations, Histogram processing, Basics of Spatial Filtering, Smoothing and Sharpening Spatial Filtering. Frequency Domain: Introduction to Fourier Transform, Smoothing and Sharpening frequency domain filters, Ideal, Butterworth and Gaussian filters.

UNIT III
Image Restoration: Model of Image Degradation/restoration process, Noise models, Inverse filtering, Least mean square filtering, Constrained least mean square filtering, Blind image restoration, Pseudo inverse, Singular value decomposition.

UNIT IV
Image Segmentation: Edge detection, Edge linking via Hough transform, Thresholding, Region based segmentation, Region growing, Region splitting and Merging, Segmentation by morphological watersheds basic concepts, Dam construction, Watershed segmentation algorithm.

UNIT V
Need for data compression, Huffman coding, Run Length Encoding, JPEG standard, MPEG. Variable length coding, LZW coding, Bit plane coding, predictive coding.
Color Imaging: Color fundamentals, Color models, Color transformation, Smoothing and Sharpening, Color segmentation

Text Books:
1. Rafael C. Gonzalez, Richard E. Woods, "Digital Image Processing", 4th Edition, Pearson, 2018.
2. Wilhelm Burger, "Principles of Digital Image Processing: Advanced Methods", 2012.

References:
1. Rafael C. Gonzalez, Richard E. Woods & Steven L. Eddins, "Digital Image Processing using MATLAB", 2nd Edition, 2010.
2. Munesh Chandra Trivedi, "Digital Image Processing", 1st Edition, 2014.
3. Ikvinderpal Singh, "Digital Image Processing", 1st Edition, 2015.
4. Ashish Jain, "Digital Image Processing (Implementation Using MATLAB)", 2012.

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MSCFN303 CYBER LAW & INTELLECTUAL PROPERTY RIGHT

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*	L	T	P	CREDITS
MSCFN303	Compulsory	Cyber Law & Intellectual Property Right	60	20	20	0	0	3	0	0	3

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

Learning Objectives:
1. To introduce fundamental aspects of Intellectual property Rights to students who are going to play a major role in development and management of innovative projects in industries.
2. To disseminate knowledge on patents, patent regime in India and abroad and registration aspects
3. To disseminate knowledge on copyrights and its related rights and registration aspects
4. To disseminate knowledge on trademarks and registration aspects
5. To disseminate knowledge on Design, Layout Design Protection and their registration aspects
6. To aware about current trends in IPR and Govt. steps in fostering IPR

Learning outcomes:
1. The students , shall get an adequate knowledge on patent and copyright for their innovative research works
2. During their research career, information in patent documents provide useful insight on novelty of their idea from state-of-the art search.
3. This provide further way for developing their idea or innovations
4. Pave the way for the students to catch up Intellectual Property(IP) as an career option
   a. R&D IP Counsel
   b. Government Jobs – Patent Examiner
   c. Private Jobs
   d. Patent agent and Trademark agent
   e. Entrepreneur

UNIT I Overview of Intellectual Property

Introduction and the need for intellectual property right (IPR) - Kinds of Intellectual Property Rights: Patent, Copyright, Trade Mark, Design, Geographical Indication, Plant Varieties and Layout Design – Genetic Resources and Traditional Knowledge – Trade Secret - IPR in India : Genesis and development – IPR in abroad - Major International Instruments concerning Intellectual Property Rights: Paris Convention, 1883, the Berne Convention, 1886, the Universal Copyright Convention, 1952, the WIPO Convention, 1967,the Patent Co-operation Treaty, 1970, the TRIPS Agreement, 1994

UNIT II Patents

Patents - Elements of Patentability: Novelty , Non-Obviousness (Inventive Steps), Industrial Application - Non - Patentable Subject Matter - Registration Procedure, Rights and Duties of Patentee, Assignment and licence , Restoration of lapsed Patents, Surrender and Revocation of Patents, Infringement, Remedies & Penalties - Patent office and Appellate Board.

UNIT III Copyrights

Nature of Copyright - Subject matter of copyright: original literary, dramatic, musical, artistic works; cinematograph films and sound recordings - Registration Procedure, Term of protection, Ownership of copyright, Assignment and licence of copyright - Infringement, Remedies & Penalties – Related Rights - Distinction between related rights and copyrights

UNIT IV Trademarks

Different kinds of marks (brand names, logos, signatures, symbols, well known marks, certification marks and service marks) - Non-Registrable Trademarks - Registration of Trademarks - Rights of holder and assignment and licensing of marks - Infringement, Remedies & Penalties - Trademarks registry and appellate board

UNIT V Design

Design: meaning and concept of novel and original - Procedure for registration, effect of registration and term of protection India`s New National IP Policy, 2016 – Govt. of India step towards promoting IPR – Govt. Schemes in IPR – Career Opportunities in IP - IPR in current scenario with case studies

Suggested Reading

1. Nithyananda, K V. (2019). Intellectual Property Rights: Protection and Management. India, IN: Cengage Learning India Private Limited.
2. Neeraj, P., &Khusdeep, D. (2014). Intellectual Property Rights. India, IN: PHI learning Private Limited. \
3. Ahuja, V K. (2017). Law relating to Intellectual Property Rights. India, IN: Lexis Nexis.

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MSCFN304 PROGRAMMING WITH PYTHON

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*	L	T	P	CREDITS
MSCFN304	Compulsory	Programming in Python	0	0	0	30	20	0	0	4	2

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

Course Objective:
1. Learn Syntax and Semantics and create Functions in Python.
2. Handle Strings and Files in Python.
3. Understand Lists, Dictionaries and Regular expressions in Python.
4. Implement Object Oriented Programming concepts in Python

Course Outcome:
After learning the course, the student will be able:
1. To develop proficiency in creating applications using the Python Programming Language.
2. To be able to understand the various data structures available in Python programming language and apply them in solving computational problems.
3. To be able to do testing and debugging of code written in Python.
4. To be able to draw various kinds of plots using PyLab.
5. To be able to do text filtering in Python

UNIT I
Introduction: History of Python, Need of Python Programming, Running Python Scripts, Variables, Assignment,Operators and Expressions: Operators- Arithmetic Operators, Comparison (Relational) Operators,Assignment Operators, Logical Operators, Bitwise Operators, Membership Operators, Identity Operators,Expressions and order of evaluations.

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UNIT II
Data Structures: Lists, Tuples, Sets, Dictionaries, Sequences.
Control Flow - if, if-elif-else, for, while, break, continue. Functions - Defining Functions, Calling Functions, Passing Arguments. Modules: Creating modules, import statement, from ..import statement, name spacing.

UNIT III
Python packages, Introduction to PIP, Installing Packages via PIP, Using Python Packages

UNIT IV
Object Oriented Programming OOP in Python: Classes, 'self variable', Methods, ConstructorMethod, Inheritance, Overriding Methods, Data Hiding.

UNIT V
File Handling: Types of Files, Creating and Reading Text Data, File Methods to Read and Write Data.

List of Experiments:
1. Develop programs to understand the control structures of python.
2. Develop programs to learn different types of structures (list, dictionary, tuples) in python.
3. Write a Python program to sum all the items in a list.
4. Write a Python program to get the largest and smallest number from a list.
5. Develop programs for data structure algorithms using python – searching and sorting.
6. Write a Python Program to perform Linear Search.
7. Write a Python Program to perform Binary Search.
8. Write a Python Program to perform Selection sort.
9. Write a Python Program to perform Insertion sort.
10. Write a Python Program to perform Merge sort.
11. Write a Python program to get a list, sorted in increasing order by the last element in each tuple from a given list of non-empty tuples: Sample List: [(2, 5), (1, 2), (4, 4), (2, 3), (2, 1)]Expected Result: [(2, 1), (1, 2), (2, 3), (4, 4), (2, 5)]
12. Write a Python program to check a list is empty or not.
13. Write a Python program to remove duplicates from a list.
14. Programs that take command line arguments (word count).
15. Write a Program that Reads a Text File and Counts the Number of Times a Certain Letter Appears in the Text File.
16. Write a Program to Read a Text File and Print all the Numbers Present in the Text File.
17. Write a Program to find the most frequent words in a text read from a file.
18. Implement Object Oriented Programming concepts in Python.
19. Write A Program to Append, Delete and Display Elements of a List Using Classes.
20. Write A Program to Create a Class and Compute the Area and the Perimeter of the Circle.

21. Write A Program to Create a Class which Performs Basic Calculator Operations.
22. Write A Program to Create a Class in which One Method Accepts a String from the User and another prints it.
23. Learn to plot different types of graphs using PyPlot.

References:

1. John V Guttag. "Introduction to Computation and Programming Using Python", 2nd edition, Prentice Hall of India, 2013
2. Wesley J. Chun. "Core Python Programming" 2nd Edition, Prentice Hall, 2006
3. Michael T. Goodrich, Roberto Tamassia, Michael H. Goldwasser, "Data Structures and Algorithms in Python", Wiley, 2013
4. Kenneth A. Lambert, "Fundamentals of Python – First Programs", CENGAGE Publication, 1st edition, 2011

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MSCFN305 PROJECT

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
MSCFN305	Compulsory	Project	0	0	0	60	40	0	0	8	4

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Every student will carry out project under supervision of supervisor (s) Internal/External. The topic shall be approved by a committee constituted by the head of the concerned Institute. Every student shall present two seminar talks, the first at the beginning of the project (Phase-1) to present the scope of the work and to finalize the topic, and towards the end of the seminar, presenting the work carried out by him/her in the semester.