# THE MAHATMA GANDHI UNIVERSITY
# UNDERGRADUATE PROGRAMMES
# (HONOURS) SYLLABUS

# MGU-UGP (Honours)

**(2024 Admission Onwards)**

**Faculty : Technology and Applied Sciences**

**Expert Committee : Cyber Forensics**

**Subject : BSc (Hons) Cyber Forensics**

**Mahatma Gandhi University**
**Priyadarshini Hills**
**Kottayam – 686560, Kerala, India**

# Preface

The MAHATMA GANDHI UNIVERSITY UNDERGRADUATE PROGRAMME (HONOURS), MGU-UGP(Honours), is a four year under graduate programme (FYUGP) in education. FYUGP curriculum comprises Foundation Components, Discipline Specific Pathway Components (Major/ Minor), and Discipline Specific Capstone Components. Cyber Forensics is a field of technology that uses investigation techniques to help identify, collect, and store evidence from an electronic device. The cyber forensics programme is designed to create well trained and skilled professionals. The programme equips individuals with the knowledge necessary for the Centre of Education in Digital Forensics Certification. The curriculum offers the students to meet the growing needs of information security and cyber forensics in the IT industry, cooperate, finance sector, law enforcement agencies and other Government agencies. The programme provides students the opportunity in cyber investigation, analysis of digital data and implementation of various security measures to prevent hacking. It also promotes the research work in the area concerned. In future, the cyber forensics experts will be an asset to the country as a part of Digital India Programme.

# Expert Committee & External Experts

**Members of Expert Committee.**

1. Dr. Kurian M J, Professor, Dept of Computer Applications, BPC College, Piravom.(Convenor)
2. Sri. Krishnakumar M.R, Associate Professor, Dept. of Computer Applications, SAS SNDP Yogam College, Konni.
3. Sri. Jobin P. Varghese, Assistant Professor, Dept. of Computer Science, KE College, Mannanam.
4. Dr. Soumya M.R, Assistant Professor, Dept. of Computer Science, Sree Sankara College, Kalady.
5. Smt. Simi M, Assistant Professor, Dept. of Computer Applications, SAS SNDP Yogam College, Konni.
6. Smt. Rajasree G., Assistant Professor, STAS, Pathanamthitta.
7. Sri. Abdul Muhammed Rasheed, Assistant Professor and HOD, STAS, Pathanamthitta.
8. Sri. Thirumeni K. R, Assistant Professor, Dept. of Computer Science, STAS, Edapally.
9. Smt. Divya S., Assistant Professor, Dept of Computer Science, STAS, Edapally.
10. Smt. Jisha Mary George, Assistant Professor, STAS, Kottayam.
11. Smt. Manju G. R , Assistant Professor, STAS, Kottayam.

**External Experts**

1. Midhun S., Assistant Professor, Department of Digital and Cyber Foresnsic Science , Sree Saraswathi Thyagaraja College ( Autonomous) , Pollachi , Tamilnadu ( Affiliated to Bharathiar University)
2. Vinu R., Senior Data Scientist , Ospyn Technologies Pvt Ltd 1st Floor , Kabani, Technopark Phase 4 , Trivandrum

## Syllabus Index

Name of the Major: **Cyber Forensics**

Semester: 1

| Course Code | Title of the Course | Type of the Course<br>DSC, MDC, SEC etc. | Credit | Hours/ week | Hour Distribution /week | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | L | T | P | O |
| MG1DSCCFS100 | Introduction to Digital Forensics and Tools | DSC A | 4 | 5 | 3 | - | 2 | - |
| MG1MDCCFS100 | Foundation of Cyber Forensics | MDC | 3 | 4 | 2 | - | 2 | - |
| MG1MDCCFS101 | Data Recovery | | 3 | 4 | 2 | - | 2 | - |
| MG1MDCCFS102 | Web Designing | | 3 | 4 | 2 | - | 2 | - |

L — Lecture, T — Tutorial, P — Practical/Practicum , O — Others

Semester: 2

| Course Code | Title of the Course | Type of the Course<br>DSC, MDC, SEC etc. | Credit | Hours/ week | Hour Distribution /week | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | L | T | P | O |
| MG2DSCCFS100 | Introduction to Ethical Hacking and Tools | DSC A | 4 | 5 | 3 | - | 2 | - |
| MG2MDCCFS100 | White Hat Hacking and Tools | MDC | 3 | 4 | 2 | - | 2 | - |
| MG2MDCCFS101 | Fundamentals of block Chain and Crypto Currency | | 3 | 4 | 2 | - | 2 | - |
| MG2MDCCFS102 | Introduction to Computer Networks | | 3 | 4 | 2 | - | 2 | - |

Semester: 3

| Course Code | Title of the Course | Type of the Course<br>DSC, MDC, SEC etc. | Credit | Hours/<br>week | Hour Distribution /week | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | L | T | P | O |
| MG3DSCCFS200 | Introduction to Programming | DSC A | 4 | 5 | 3 | - | 2 | - |
| MG3DSCCFS201 | Computer Organization | DSC A | 4 | 5 | 3 | - | 2 | - |
| MG3DSECFS200 | TCP/IP and Network Security (Network Security Specialization) | DSE | 4 | 4 | 4 | - | - | - |
| MG3DSECFS201 | Operating Systems (Operating System Architecture Specialization) | DSE | 4 | 4 | 4 | - | - | - |
| MG3DSECFS202 | Parallel Processing (Modern Computing with Resource Sharing Specialization) | DSE | 4 | 4 | 4 | - | - | - |
| MG3DSCCFS202 | Computer Security | DSC B | 4 | 5 | 3 | - | 2 | - |
| MG3MDCCFS200 | Kerala Specific Content | MDC | 3 | 3 | 3 | - | - | - |
| MG3VACCFS200 | E-Waste Management and Re-cycling | VAC | 3 | 3 | 3 | - | - | - |

Semester: 4

| Course Code | Title of the Course | Type of the Course<br>DSC, MDC, SEC etc. | Credit | Hours/<br>week | Hour Distribution /week | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | L | T | P | O |
| MG4DSCCFS200 | Data Structure using C++ | DSC A | 4 | 5 | 3 | - | 2 | - |
| MG4DSCCFS201 | Applied Cryptography | DSC A | 4 | 5 | 3 | - | 2 | - |
| MG4DSECFS200 | Virtual Private Network Security (Network Security Specialization) | DSE | 4 | 4 | 4 | - | - | - |
| MG4DSECFS201 | Linux Administration (Operating System Architecture Specialization) | DSE | 4 | 4 | 4 | - | - | - |
| MG4DSECFS202 | Distributed Systems (Modern Computing with Resource Sharing Specialization) | DSE | 4 | 4 | 4 | - | - | - |
| MG4DSCCFS202 | Incident Response in Cyber Forensics | DSC B | 4 | 5 | 3 | - | 2 | - |
| MG4SECCFS200 | Programming in Java | SEC | 3 | 3 | - | 3 | - | - |
| MG4VACCFS200 | Cyber Laws and Case Studies | VAC | 3 | 3 | 3 | - | - | - |
| MG4INTCFS200 | Internship | | 2 | | | | | |

Semester: 5

| Course Code | Title of the Course | Type of the Course<br>DSC, MDC, SEC etc. | Credit | Hours/<br>week | Hour Distribution /week | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | L | T | P | O |
| MG5DSCCFS300 | Database Management system and Security | DSC | 4 | 5 | 3 | - | 2 | - |
| MG5DSCCFS301 | Security analysis using Python | DSC | 4 | 5 | 3 | - | 2 | - |
| MG5DSECFS300 | Remote Sensing Network (Network Security Specialization) | DSE<br>(Any two) | 4 | 4 | 4 | - | - | - |
| MG5DSECFS301 | Internet of Things (Network Security Specialization) | | 4 | 4 | 4 | - | - | - |
| MG5DSECFS302 | Embedded Systems (Network Security Specialization) | | 4 | 4 | 4 | - | - | - |
| MG5DSECFS303 | Mobile Application Development- Android<br>(Operating System Architecture Specialization) | | 4 | 4 | 4 | - | - | - |
| MG5DSECFS304 | Soft Computing Techniques<br>(Modern Computing with Resource Sharing Specialization) | | 4 | 4 | 4 | - | - | - |
| MG5DSECFS305 | Biometric Security | DSE<br>(Any one) | 4 | 4 | 4 | - | - | - |
| MG5DSECFS306 | Mobile and Wireless Security | | 4 | 4 | 4 | - | - | - |
| MG5DSECFS307 | Critical Infrastructure Security and Forensics | | 4 | 4 | 4 | - | - | - |
| MG5DSECFS308 | Security Threats and Vulnerabilities | | 4 | 4 | 4 | - | - | - |
| MG5DSECFS309 | Cyber security Audit and Compliance | | 4 | 4 | 4 | - | - | - |
| MG5DSECFS310 | M-Commerce Security | | 4 | 4 | 4 | - | - | - |
| MG5SECCFS300 | Cyber Warfare | SEC | 3 | 3 | 3 | - | - | - |

Semester: 6

| Course Code | Title of the Course | Type of the Course<br>DSC, MDC, SEC etc. | Credit | Hours/<br>week | Hour Distribution /week | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | L | T | P | O |
| MG6DSCCFS300 | Preserving and Recovering Digital Evidence | DSC | 4 | 5 | 3 | - | 2 | - |
| MG6DSCCFS301 | Kali Linux | DSC | 4 | 5 | 3 | - | 2 | - |
| MG6DSECFS300 | Social Media Security (Network Security Specialization) | DSE | 4 | 4 | 4 | - | - | - |
| MG6DSECFS301 | Compiler Design (Operating System Architecture Specialization) | DSE | 4 | 4 | 4 | - | - | - |
| MG6DSECFS302 | Security and Privacy in Cloud Computing (Modern Computing with Resource Sharing Specialization) | DSE | 4 | 4 | 4 | - | - | - |
| MG6DSECFS303 | Security Scripting using Ruby | DSE | 4 | 4 | 3 | 1 | - | - |
| MG6DSECFS304 | Security Scripting using Perl | DSE | 4 | 4 | 3 | 1 | - | - |
| MG6DSECFS305 | Security Scripting using Node.JS | DSE | 4 | 4 | 3 | 1 | - | - |
| MG6SECCFS300 | Penetration Testing Tools | SEC | 3 | 4 | 2 | - | 2 | - |
| MG6VACCFS300 | Artificial Intelligence Ethics | VAC | 3 | 3 | 3 | - | - | - |

Semester: 7

| Course Code | Title of the Course | Type of the Course<br>DSC, MDC, SEC etc. | Credit | Hours/<br>week | Hour Distribution /week | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | L | T | P | O |
| MG7DCCCFS400 | Machine Learning using Python | DCC | 4 | 5 | 3 | - | 2 | - |
| MG7DCCCFS401 | Software Engineering | DCC | 4 | 4 | 4 | - | - | - |
| MG7DCCCFS402 | Block chain Technology | DCC | 4 | 4 | 4 | - | - | - |
| MG7DCECFS400 | Multimedia Security | DCE | 4 | 4 | 4 | - | - | - |
| MG7DCECFS401 | Technical Documentation | DCE | 4 | 4 | 4 | - | - | - |
| MG7DCECFS402 | Mobile Forensics | DCE | 4 | 4 | 4 | - | - | - |

Semester: 8

| Course Code | Title of the Course | Type of the Course<br>DSC, MDC, SEC etc. | Credit | Hours/<br>week | Hour Distribution /week | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | L | T | P | O |
| MG8DCCCFS400 | Malware and Attacking Techniques | DCC | 4 | 5 | 3 | - | 2 | - |
| MG8DCCCFS401 | Bug Bounty | DCC | 4 | 5 | 3 | - | 2 | - |
| MG8DCECFS400 | Reverse Engineering and Case Studies | DCE | 4 | 5 | 3 | - | 2 | - |
| MG8DCECFS401 | Design and Analysis of Algorithm | DCE | 4 | 5 | 3 | - | 2 | - |
| MG8DCECFS402 | Data Mining and Big Data Analysis with Tools | DCE | 4 | 5 | 3 | - | 2 | - |
| | **OR** | | | | | | | |
| MG8DCECFS403 | Research methodology in Cyber Forensics | DCE | 4 | 5 | 3 | - | 2 | - |
| MG8DCECFS404 | Publication Ethics and Documentation Standards | DCE | 4 | 5 | 3 | - | 2 | - |
| MG8DCECFS405 | Statistical Analysis of Research Data and Tools | DCE | 4 | 5 | 3 | - | 2 | - |
| | **OR** | | | | | | | |
| MG8PRJCFS400 | **Project/Dissertation** | PRJ | 12 | | | | | |

# SEMESTER 1

# Mahatma Gandhi University Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | **BSc (Hons) Cyber Forensics** | | | | | |
| **Course Name** | **INTRODUCTION TO DIGITAL FORENSICS AND TOOLS** | | | | | |
| **Type of Course** | DSC A | | | | | |
| **Course Code** | MG1DSCCFS100 | | | | | |
| **Course Level** | **100-199** | | | | | |
| **Course Summary** | The course is about preserving evidence, identifying criminals, protecting corporate interests, assisting in cyber crime investigations, and facilitating legal proceedings. | | | | | |
| **Semester** | I | Credits | | | 4 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 3 | 0 | 1 | 0 | 75 |
| **Pre-requisites, if any** | | | | | | |

**COURSE OUTCOMES (CO)**

| CO No. | Expected Course Outcomes upon completion of this course , the students will be able to: | Learning Domains * | PO No |
|---|---|---|---|
| 1 | Understand the role and uses of digital forensics in criminal investigations. | Understand | 1,2 |
| 2 | Understand how data are collected as evidence and analyse windows system artifacts | Understand | 1,2 |
| 3 | Analyse image files and artifacts using appropriate tools. | Analyse | 3 |
| 4 | Undertake basic digital forensic investigation, by using a variety of digital forensics tools. | Apply | 3,4 |

***Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)***

## COURSE CONTENT

### Content for Classroom transaction (Units)

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Introduction to Digital Forensics, Forensic Science, Uses of Digital Forensics | 3 | 1 |
| | 1.2 | Procedure of digital evidence-Identification, Collection and Preservation | 3 | 1,2 |
| | 1.3 | Lab tools-Forensic laboratories, virtual labs, lab security | 4 | 2 |
| | 1.4 | Evidence Storage, Policies and Procedures | 3 | 2 |
| 2 | 2.1 | Collecting Evidence: Crime Scenes and Collecting evidence, Documenting the scenes | 5 | 2 |
| | 2.2 | Chain of custody, Live system vs Dead System, Hashing, Report | 4 | 2 |
| | 2.3 | Windows System artifacts: Registry, Deleted data, Hibernation file | 5 | 1,2 |
| 3 | 3.1 | Introduction to Anti-forensics: hiding data, Password attacks, Steganography, Data Destruction | 3 | 1,3 |
| | 3.2 | Network Forensics: Fundamentals, types, attacks | 2 | 1,3 |
| | 3.3 | Legal: Basics of law, the fourth amendment, Criminal law, Searching with a warrant, e Discovery | 4 | 1,3 |
| | 3.4 | Apply theoretical knowledge through hands-on labs and practical –<br>Identification and collection-Autopsy | 5 | 3,4 |
| | 3.5 | Registry Analysis – Reg-ripper | 4 | 3,4 |

| | | | | |
|---|---|---|---|---|
| | | Data Preservation tool – Guymager | | |
| 4 | 4.1 | Introduction to data carving tools- Analyse an image -FTK | 10 | 1,4 |
| | 4.2 | Analyse an image file using -Pro Discover | 10 | 4 |
| | 4.3 | Data carving tool- FDAC, Foremost, Scalpel, Steganography - steghide | 10 | 4 |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Evaluation is internal. | | |

| | |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture and Practical** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 25 Marks**<br>**Written Test / Seminar / Viva/ Assignments**<br>**Practical 15 Marks** |
| | **B. Semester End examination 50 Marks**<br>**Written test**<br>**Practical Examination 35 Marks** |

## References

1. Digital Forensics with Kali Linux Enhance your investigation skills by performing network and memory forensics with Kali Linux 2022.x, 3rd Edition (Kindle Edition)Shiva V. N. Parasram
2. The Basics of Digital Forensics The Primer for Getting Started in Digital Forensics John Sammons Technical Editor Jonathan Rajewski
3. Cyber Forensics - Concepts and Approaches, Ravi Kumar & B Jain,2006, ICFAI University press
4. Computer Forensics: Computer Crime Scene Investigation, 2nd Edition, John R. Vacca, Charles River Media, 2005

# Mahatma Gandhi University
# Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | | | | | | |
| **Course Name** | **FOUNDATION OF CYBER FORENSICS** | | | | | |
| **Type of Course** | MDC | | | | | |
| **Course Code** | MG1MDCCFS100 | | | | | |
| **Course Level** | **100-199** | | | | | |
| **Course Summary** | This course provides students with a comprehensive understanding of the foundational principles of Cyber Forensics and programming methodologies | | | | | |
| **Semester** | I | Credits | | | 3 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 2 | 0 | 1 | 0 | 60 |
| **Pre-requisites, if any** | | | | | | |

**COURSE OUTCOMES (CO)**

| CO No. | Expected Course Outcomes upon completion of this course , the students will be able to: | Learning Domains * | PO No |
|---|---|---|---|
| 1 | Understand how computer forensics assists in legal and law enforcement contexts | **Understand** | 1 |
| 2 | Apply business computer forensic technology to real-world scenarios. Analyze the types of law enforcement computer forensic technology. | **Analyse** | 2,3 |
| 3 | Understanding cyber forensics tools | **Understand** | 1,2 |
| 4 | Evaluate the windows registry | **Evaluate** | 3 |
| ***Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)*** | | | |

**COURSE CONTENT**

**Content for Classroom transaction (Units)**

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Computer Forensics Fundamentals: What is Computer Forensics. Use of Computer Forensics in Law enforcement. | 4 | 1 |
| | 1.2 | Computer Forensics Assistance to Human Resources/Employment Proceedings, Computer Forensics Services. | 4 | 1 |
| | 1.3 | Benefits of professional Forensics Methodology, Steps taken by Computer Forensics Specialists. | 4 | 2 |
| 2 | 2.1 | Types of Computer Forensics Technology: - Types of Business Computer Forensic Technology. | 3 | 2 |
| | 2.2 | Types of Military Computer Forensic Technology | 3 | 1 |
| | 2.3 | Types of Law Enforcement- Computer Forensic Technology, | 3 | 1 |
| | 2.4 | Types of Business Computer Forensic Technology. | 3 | 1 |
| | 2.5 | Computer Forensics Evidence and capture: Data Recovery Defined- Data Back-up and Recovery | 3 | 2 |
| | 2.6 | -The Role of Back -up in Data Recovery-The Data -Recovery Solution | 3 | 2 |
| 3 | 3.1 | Definition and types of cyber forensics tools (e.g., acquisition tools, analysis tools, reporting tools),Importance of using forensically sound toolsSelecting appropriate tools based on specific needs and evidence types | 4 | 3 |
| | 3.2 | Introduction to disk imaging and its importance in forensicsPopular disk imaging tools (e.g., FTK Imager, EnCase Forensic Imager), | 3 | 3 |
| | 3.3 | Understanding file system structures and their role in forensics | 4 | 3 |
| | 3.4 | Exploring file system analysis tools (e.g., FTK Imager Viewer, EnCase Forensic Explorer)Demonstrations on examining file systems and extracting evidence using selected tools, | 4 | 4,5 |

| | | | | |
|---|---|---|---|---|
| 4 | 4.1 | Significance of registry analysis in Windows forensics,Introduction to Windows registry structure and key locations for evidence | 3 | 3 |
| | 4.2 | Exploring registry analysis tools (e.g., Registry Explorer, EnCase Registry Viewer),Demonstrations on navigating the registry, searching for specific evidence, and interpreting findings. **-** | 3 | 3 |
| | 4.3 | Introduction to network capture tools and their role in network forensics,Exploring popular network capture tools (e.g., Wireshark, tcpdump) | 1 | 3 |
| | 4.4 | Introduction to mobile forensics tools and their functionalities, | 4 | 3 |
| | 4.5 | ,Exploring basic mobile forensics tools (e.g., Cellebrite Physical Analyzer, Oxygen Forensic Suite) | 4 | 4,5 |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.. Evaluation is internal. | | |

| | |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture and Practical** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 15 Marks**<br>**Written Test / Seminar / Viva/ Assignments**<br>**Practical 15 Marks** |
| | **B. Semester End examination 35 Marks**<br>**Written test**<br>**Practical Examination 35 Marks** |

## References:

1. Computer Forensics, Computer Crime Investigation by John R Vacca, Firewall Media, New Delhi.
2. Computer Forensics and Investigations by Nelson, Phillips Enfinger, Steuart, CENGAGE Learning.
3. Real Digital Forensics by Keith j.Jones, Richard Bejitlich,Curtis W.Rose,Addison Wesley Pearson Education
4. Forensic Compiling, A Tractitioneris Guide by Tony Sammes and Brain Jenkinson ,Springer International edition.
5. Ashok Kamthane - Programming in C, Third Edition, Pearson Education
6. P K Sinha & Priti Sinha - Computer Fundamentals , Fourth Edition, BPB Publications.

# Mahatma Gandhi University
# Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | | | | | | |
| **Course Name** | **DATA RECOVERY** | | | | | |
| **Type of Course** | MDC | | | | | |
| **Course Code** | MG1MDCCFS101 | | | | | |
| **Course Level** | **100-199** | | | | | |
| **Course Summary** | This is a comprehensive course on data recovery involves covering a range of topics, from the basics of storage devices to basic techniques for recovering data | | | | | |
| **Semester** | I | Credits | | | 3 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 2 | 0 | 1 | 0 | 60 |
| **Pre-requisites, if any** | | | | | | |

COURSE OUTCOMES (CO)

| CO No. | Expected Course Outcomes upon completion of this course , the students will be able to: | Learning Domains * | PO No |
|---|---|---|---|
| 1 | Understand the importance of data recovery, file systems and types of storage devices | Understand | 1 |
| 2 | Analyse basic concepts for backup and prevention from common data loss scenarios | Analyse | 1,2 |
| 3 | Understanding disk imaging techniques and learn hands-on lab when to use these techniques for data recovery. | Understand | 1 |
| 4 | Apply hands-on data backup strategies And Acquire skills in file carving using different tools | Apply | 3,4 |

***Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)***

**COURSE CONTENT**

**Content for Classroom transaction (Units)**

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Introduction to data recovery-common cause of data loss | 3 | 1 |
| | 1.2 | Types of Storage Devices-HDD,SSD,USB drives, memory cards | 5 | 1,2 |
| | 1.3 | Understanding file systems-FAT32,NTFS, exFat | 7 | 1,3 |
| 2 | 2.1 | Basic concepts and techniques-Backup and prevention plans | 5 | 1,2 |
| | 2.2 | Common data loss scenarios – Accidental deletion, formatting errors, file system correction | 5 | 2,3 |
| | 2.3 | Virus and malware attacks | 5 | 1,3 |
| 3 | 3.1 | Understanding hard drive architecture- platters, spindle , heads, actuators | 4 | 1,3 |
| | 3.2 | Disk imaging tools and technique | 2 | 2,3 |
| | 3.3 | Disk imaging tools-dd(cm-line-tool),Clone-zilla, dd rescue,Win32 Disk Imager, R-Drive | 2 | 3,4 |
| | 3.4 | Apply Hands-on lab practical - Disk partitioning (windows) , Familiarize hard disk parts | 4 | 4 |
| | 3.5 | Hands-on lab practical -Disk imaging tools-dd,win32 Disk imager, clone zilla/dd rescue/R-drive ,Part image | 4 | 4 |
| 4 | 4.1 | Key selection criteria to choosing a data recovery tool | 3 | 4 |
| | 4.2 | Understanding of Data Recovery Tools and Software :Recuva, Easeus Data Recovery Wizard, Disk | 4 | 3,4 |

| | | | | |
|---|---|---|---|---|
| | | Drill,PhotoRec, R-Studio, Pandora | | |
| | 4.3 | Apply Hands-on lab practical - Data Recovery tools : Recuva ,Easeus Data Recovery Wizard/Windows File recovery ,Pandora | 3 | 4 |
| | 4.4 | Data Carving tools : FDAC , Scalpel , PhotoRec | 4 | 4 |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Evaluation is internal. | | |

| | |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture and practical** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 15 Marks**<br>**Written Test / Seminar / Viva/ Assignments**<br>**Practical 15 Marks** |
| | **B. Semester End examination 35 Marks Time :1.5 hrs**<br>**Written test**<br>**Practical Examination 35 Marks** |

**References**

1. Data Recovery A Complete Guide - 2019 Edition Paperback – Import, 4 July 2019 by Gerardus Blokdyk (Author)
2. File System Forensic Analysis by Brian Carrier
3. Digital Forensics with Open Source Toolsby Cory Altheide and Harlan Carvey
4. Refer Online Documentation of Data Recovery Tools : https://recoverit.wondershare.com/document-recovery/top-10-document-recovery-software.html https://www.easeus.com/datarecoverywizard/free-data-recovery-software.html
5. Online documentation of Understanding Hard drive architecture https://www.educative.io/answers/what-is-the-hard-disk-architecture-in-operating-systems
6. Pro Data Backup And Recovery by Steven nelson

# Mahatma Gandhi University Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | | | | | | |
| **Course Name** | **WEB DESIGNING** | | | | | |
| **Type of Course** | MDC | | | | | |
| **Course Code** | MG1MDCCFS102 | | | | | |
| **Course Level** | **100-199** | | | | | |
| **Course Summary** | Throughout the course, emphasis is placed on creating visually appealing, accessible, and user-friendly websites. Students gain practical skills for designing and implementing web interfaces using HTML and CSS. | | | | | |
| **Semester** | I | Credits | | | 3 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 2 | 0 | 1 | 0 | 60 |
| **Pre-requisites, if any** | | | | | | |

## COURSE OUTCOMES (CO)

| CO No. | Expected Course Outcomes upon completion of this course , the students will be able to: | Learning Domains * | PO No |
|---|---|---|---|
| 1 | Understand the basic knowledge and skills to create simple yet effective HTML-based web pages. | Understand(U) | **1,3** |
| 2 | Develop and analyse skill to create interactive and visually appealing web pages, incorporating multimedia elements and collecting data through HTML forms. | Apply(A) | **1,3** |
| 3 | Evaluate and analyse you should be equipped with the skills to create visually appealing, well-structured, and responsive web pages | Evaluate(E) | **3,4** |
| 4 | Evaluate a portfolio showcasing completed web designed projects | Evaluate(E) | **3,4** |
| ***Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)*** | | | |

## COURSE CONTENT

**Content for Classroom transaction (Units)**

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Introduction to web, WWW architecture, Fundamentals of HTML | **3** | **1** |
| | 1.2 | HTML Formatting Tags, HTML Color Coding, creating tables, frames | **4** | **1,2,3** |
| | 1.3 | working with form elements. HTML list., text formatting tags, marquee. | **3** | **1,2,3** |
| 2 | 2.1 | Introduction on HTML, Forms & Images Using HTML: Graphics: Introduction-How to work efficiently with images in web pages | **3** | **1** |
| | 2.2 | Image in Web page image maps, GIF animation, adding multimedia, data collection with HTML forms text box, password | **3** | **3,4** |
| | 2.3 | list box, combo box, text area, tools for building web page front page. | **4** | **3,4** |
| 3 | 3.1 | CSS and its importance in HTML web page designing, CSS introduction CSS2,CCS3, CSS4 and features,<link> and <style> elements | **3** | **1,2** |
| | 3.2 | CSS properties, Controlling Fonts, Text formatting.CSS Tables, including their border, padding, color, text, height and width. and CSS lists,The border, outline, margin, padding, | **3** | **2,3** |
| | 3.3 | CSS dimensions. Borders border-radius Border Images Backgrounds Background Size background-origin Text Effects text-shadow. | **4** | **2,3** |
| 4 | 4.1 | Simple HTML programs | **10** | **3,4** |
| | 4.2 | HTML programs Using Form and controls | **10** | **3,4** |
| | 4.3 | Web design using HTML | **10** | **3,4** |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Evaluation is internal. | | |

| | |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture and Practical** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 15 Marks**<br>**Written Test / Seminar / Viva/ Assignments**<br>**Practical 15 Marks** |
| | **B. Semester End examination 35 Marks Time:1.5 hrs**<br>**Written test**<br>**Practical Examination 35 Marks** |

## REFERENCES

1. Ivan Bayross - “HTML, DHTML, JavaScript, Pearl & CGI ”, Fourth Revised Edition, BPB Publication
2. Laura Lemay, Rafe Colburn , Jennifer Kyrnin, “Mastering HTML, CSS & Javascript Web Publishing”, 2016.
3. DT Editorial Services (Author), “HTML 5 Black Book (Covers CSS3, JavaScript, XML, XHTML, AJAX, PHP, jQuery)”, Paperback 2016, 2nd Edition.
4. C. Xavier, “World Wide Web Design with HTML”, TMH Publishers 2001.
5. Head First HTML and CSS -Elizabeth Robson and Eric Freeman,2nd Edition, Kindle Edition
6. HTML and CSS: Design and Build Websites author-Jon Duckett,1st edition,Wiley Publication

# SEMESTER 2

# Mahatma Gandhi University
# Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | **BSc (Hons) Cyber Forensics** | | | | | |
| **Course Name** | **INTRODUCTION TO ETHICAL HACKING AND TOOLS** | | | | | |
| **Type of Course** | DSC A | | | | | |
| **Course Code** | MG2DSCCFS100 | | | | | |
| **Course Level** | **100 - 199** | | | | | |
| **Course Summary** | Foundational understanding of ethical hacking,computer network be familiar with common hacking tools and methodologies, and possess the skills to conduct ethical hacking assessments in a controlled and responsible manner | | | | | |
| **Semester** | II | Credits | | | 4 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 3 | 0 | 1 | 0 | 75 |
| **Pre-requisites, if any** | Basic knowledge of computer networks, operating systems, and cybersecurity concepts is recommended | | | | | |

**COURSE OUTCOMES (CO)**

| **CO No.** | **Expected Course Outcomes upon completion of this course , the students will be able to:** | **Learning Domains *** | **PO No** |
|---|---|---|---|
| 1 | Understanding the Ethical hacking concepts, basic networking and ethical guidelines governing ethical hacking | Understand | 1,2 |
| 2 | Understand the various types of attacks and security threats and vulnerabilities present in the computer system | Understand | 1,2 |
| 3 | Analyse how to protect a website and explain the basic concepts of social engineering | Analyse | 2 |
| 4 | Apply theoretical knowledge through hands-on labs and practical exercises. Such as Metasploit, Wireshark, Nmap, and others. | Apply | 3,4 |

***Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)***

**COURSE CONTENT**

**Content for Classroom transaction (Units)**

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Introduction to EH, Steps- Define scope, Authorization, Reconnaissance | 3 | 1 |
| | 1.2 | Gaining Access- Vulnerability analysis, maintaining access -Exploitation, Post-Exploitation, Clearing tracks, Documentation and reporting | 4 | 1 |
| | 1.3 | Hacking- Types of hackers-White hat, Grey hat, Black hat hacker | 3 | 1 |
| | 1.4 | Cyber laws-understanding cyber space | 3 | 1 |
| 2 | 2.1 | Various Attacks-Malware attacks, Phishing attacks | 3 | 1,2 |
| | 2.2 | Dos, DDos attacks, Input validation attacks, SQL Injection attacks | 3 | 2 |
| | 2.3 | Buffer Overflow attacks, Privacy attack, Password attacks, Social engineering attacks | 3 | 1,2 |
| | 2.4 | Spoofing-IP Spoofing, Vulnerability vs Threat vs Risk | 3 | 1,2 |
| 3 | 3.1 | Protection of websites, Intrusion detection system-NIDS, HIDS | 3 | 1,3 |
| | 3.2 | Basic computer network protocols, TCP/IP Model | 3 | 1,3 |
| | 3.3 | Firewalls-Packet filter firewalls, Packet inspection firewall-Application proxy firewalls, Hardware firewall, software firewall | 3 | 1,3 |
| | 3.4 | Apply theoretical knowledge through hands-on labs and practical exercise – VMWare creation and OS installation (windows7/kali Linux) | 3 | 3 |
| | 3.5 | Windows hacking- Metasploit | 5 | 4 |
| | 3.6 | Password Hacking-John the Ripper, Dictionary attack using HYDRA, Medusa | 3 | 4 |

| | | | | |
|---|---|---|---|---|
| 4 | 4.1 | Web hacking- SQL Map, Vulnerability scanning –Nmap | 8 | 4 |
| | 4.2 | Dos Attack – Evillimiter, HOIC/LOIC | 6 | 4 |
| | 4.3 | Spoofing Tools-Ettercap, Wireshark ,ZAP | 8 | 4 |
| | 4.4 | Social Engineering tools – SE toolkit / ZPhisher | 8 | 4 |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Evaluation is internal. | | |

| | |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecturing and Practical** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 25 Marks**<br>**Written Test / Seminar / Viva/ Assignments**<br>**Practical 15 Marks** |
| | **B. Semester End examination 50 Marks, 1.5 hours**<br>**Written test**<br>**Practical Examination 35 Marks** |

## References

1. Hacking for Beginners: Step By Step Guide to Cracking Codes Discipline, Penetration Testing, and Computer Virus. Learning Basic Security Tools on How To Ethical Hack And Grow Paperback – Import, 29 October 2020 by Karnel Erickson
2. Unofficial Guide to Ethical Hacking, Ankit Fadia
3. Ethical Hacking,Ankit Adia, Second edition, 2006, Macmillan India Ltd.
4. Penetration Testing: A Hands-On Introduction to Hacking Paperback – Illustrated, 14 June 2014by Georgia Weidman (Author)
5. Beginner to Expert Guide to Computer Hacking, Basic Security, and Penetration Testing By James Patterson
6. Cyber Law Crimes, Barkhs and U. Rama Mohan, Third Edition ,2017,Asia Law House
7. Cyber Laws Simplified, ViveekSood, Fourth reprint 2008,McGraw Hill.
8. URL :https://www.infosectrain.com/blog/phases-of-ethical-hacking/

# Mahatma Gandhi University
# Kottayam

<table>
<tr><td><b>Programme</b></td><td colspan="6"></td></tr>
<tr><td><b>Course Name</b></td><td colspan="6"><b>WHITE HAT HACKING AND TOOLS</b></td></tr>
<tr><td><b>Type of Course</b></td><td colspan="6">MDC</td></tr>
<tr><td><b>Course Code</b></td><td colspan="6">MG2MDCCFS100</td></tr>
<tr><td><b>Course Level</b></td><td colspan="6"><b>100-199</b></td></tr>
<tr><td><b>Course Summary</b></td><td colspan="6">This course provides a comprehensive introduction to the field of white hat hacking and develop the skills to hands-on experience the social media hacking tools and types of attacks present in the computer system</td></tr>
<tr><td><b>Semester</b></td><td>II</td><td colspan="3">Credits</td><td>3</td><td rowspan="2">Total Hours</td></tr>
<tr><td rowspan="2"><b>Course Details</b></td><td rowspan="2">Learning Approach</td><td>Lecture</td><td>Tutorial</td><td>Practical</td><td>Others</td></tr>
<tr><td>2</td><td>0</td><td>1</td><td>0</td><td>60</td></tr>
<tr><td><b>Pre-requisites, if any</b></td><td colspan="6"></td></tr>
</table>

**COURSE OUTCOMES (CO)**

| **CO No.** | **Expected Course Outcomes upon completion of this course , the students will be able to:** | **Learning Domains *** | **PO No** |
|---|---|---|---|
| 1 | Understand the white hat hacking concepts, basic networking and cyber ethics-hacking | Understand | 1 |
| 2 | Understand the various types of attacks, attackers and vulnerabilities | Understand | 1 |
| 3 | Apply theoretical knowledge through hands-on labs and practical exercises, such as Social media hacking tools | Apply | 1,2 |
| 4 | Analyse the social engineering | Analyse | 2,3 |
| ****Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)*** | | | |

**COURSE CONTENT**

**Content for Classroom transaction (Units)**

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Introduction to white hat hacking-Reconnaissance, Scanning and enumeration | 2 | 1 |
| | 1.2 | Gaining Access – Vulnerability analysis | 3 | 1 |
| | 1.3 | Maintaining Access-Exploitation, Post-Exploitation, Clearing tracks, Documentation and reporting | 3 | 1 |
| | 1.4 | Hacking- Types of hackers-White hat hacker, Grey hat hacker, black hat hacker | 4 | 1,2 |
| | 1.5 | Cyber laws- basics of law, Defining cyber law, cyber crimes-types of cyber crimes | 3 | 1,2 |
| 2 | 2.1 | Various attacks- Malware attacks, Phishing attacks | 4 | 1,2 |
| | 2.2 | Dos attacks, DDos attacks, Password attacks | 3 | 1,2 |
| | 2.3 | Social engineering attacks, Spoofing -IP spoofing | 3 | 1,2 |
| | 2.4 | Vulnerability vs threat vs Risk | 2 | 1,2 |
| | 2.5 | Firewalls –Packet filter firewalls, Packet inspection firewalls, hardware firewall, software firewall | 3 | 1,2 |
| 3 | 3.1 | Apply theoretical knowledge through hands- on labs VMWare creation | 4 | 3 |
| | 3.2 | OS installation (windows/kali Linux) | 4 | 3 |
| | 3.3 | Vulnerability Scanning tools - Nmap | 4 | 3 |
| | 3.4 | Password Hacking tools – John the Ripper | 3 | 3 |

|  |  |  |  |  |
|---|---|---|---|---|
| 4 | 4.1 | Hands-on labs on social media hacking tools Spoofing tools-Wireshark | 5 | 3,4 |
|  | 4.2 | Social Engineering tool - SEToolkit | 5 | 3,4 |
|  | 4.3 | Phishing tools-Zphisher, Email phishing/Cloning phishing | 5 | 3,4 |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Evaluation is internal. |  |  |

|  |  |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecturing and Practical** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 15 Marks**<br>**Written Test / Seminar / Viva/ Assignments**<br>**Practical 15 Marks** |
|  | **B. Semester End examination 35 Marks,1.5 hours**<br>**Written test**<br>**Practical Examination 35 Marks** |

**References**

1. Hacking for Beginners: Step By Step Guide to Cracking Codes Discipline, Penetration Testing, and Computer Virus. Learning Basic Security Tools on How To Ethical Hack And Grow Paperback – Import, 29 October 2020 by Karnel Erickson
2. Cyber Law Crimes, Barkhs and U. Rama Mohan, Third Edition ,2017,Asia Law House
3. Cyber Laws Simplified,Vivek Sood, Fourth reprint 2008,McGraw Hill
4. Penetration Testing: A Hands-On Introduction to Hacking Paperback – Illustrated, 14 June 2014by Georgia Weidman
5. Beginner to Expert Guide to Computer Hacking, Basic Security, and Penetration Testing By James Patterson
6. Cyber Law Crimes, Barkhs and U. Rama Mohan, Third Edition ,2017,Asia Law House
7. Cyber Laws Simplified,ViveekSood, Fourth reprint 2008,McGraw Hill.
8. URL :https://www.infosectrain.com/blog/phases-of-ethical-hacking/
9. Ethical Hacking: A Hands-on Introduction to Breaking In Kindle Editionby Daniel G. Graham (Author)

# Mahatma Gandhi University
# Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | | | | | | |
| **Course Name** | **FUNDAMENTALS OF BLOCK CHAIN AND CRYPTOCURRENCY** | | | | | |
| **Type of Course** | MDC | | | | | |
| **Course Code** | MG2MDCCFS101 | | | | | |
| **Course Level** | **100 - 199** | | | | | |
| **Course Summary** | Able to build an awareness of block chain technology and how it can be used to process cryptocurrency transactions. By the end of the course, participants will gain a comprehensive understanding of block chain technology and its implications for decentralized systems. | | | | | |
| **Semester** | II | Credits | | | 3 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 2 | | 1 | | 60 |
| **Pre-requisites, if any** | | | | | | |

**COURSE OUTCOMES (CO)**

| CO No. | Expected Course Outcomes upon completion of this course , the students will be able to: | Learning Domains * | PO No |
|---|---|---|---|
| 1 | Understand the block chain technology and its implications for decentralized systems. | **Understand** | **1** |
| 2 | Analyse the cryptographic principles in the context of block chain, | **Analyse** | **1,2** |
| 3 | Evaluate and analyse Bitcoin, from transactions and network structure to practical aspects | **Evaluate** | **4,2** |
| 4 | Proficient in block chain development, | **Evaluate** | **3,4** |

***Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)***

**COURSE CONTENT**

**Content for Classroom transaction (Units)**

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Introduction to block chain Technology, The history of block chain | **3** | **1** |
| | 1.2 | CAP theorem, Benefits and limitations of block chain | **2** | **1** |
| | 1.3 | Decentralization using block chain | **2** | **1,2** |
| | 1.4 | Methods of decentralization and Routes to decentralization | **3** | **1,2** |
| 2 | 2.1 | Cryptography in Block chain introduction | **2** | **1** |
| | 2.2 | Cryptographic primitives | **2** | **1,2** |
| | 2.3 | Asymmetric cryptography public and private keys | **2** | **1,2** |
| | 2.4 | Bitcoin improvement proposals (BIPs) – Consensus Algorithms. | **4** | **2,3** |
| 3 | 3.1 | BITCoin Introduction and Transaction | **2** | **2,3** |
| | 3.2 | The genesis block – The bitcoin network | **2** | **2,3** |
| | 3.3 | Wallets and its types,Bitcoin payments | **2** | **1,2** |
| | 3.4 | Bitcoin investment and buying and selling bitcoins , Bitcoin installation, BIPs | **4** | **3,4** |
| 4 | 4.1 | Creating Merkle tree<br>Creation of Block | **5** | **3,4** |
| | 4.2 | Block chain Implementation Programming code | **5** | **3,4** |

|  |  |  |  |  |
|---|---|---|---|---|
|  | 4.3 | Creating ERC20 token, Java code to implement block chain in Merkle Trees | **10** | **3,4** |
|  | 4.4 | Java Code to implement Mining using block chain,<br>Java Code to implement peer-to-peer using block chain, Creating a Crypto-currency Wallet | **10** | **3,4** |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Evaluation is internal. |  |  |

|  |  |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture and Practical** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 15 Marks**<br>**Written Test / Seminar / Viva/ Assignments**<br>**Practical 15 Marks** |
|  | **B. Semester End examination 35 Marks,1.5 hours**<br>**Written test**<br>**Practical Examination 35 Marks** |

## REFERENCES

1. Mastering Blockchain: Distributed ledger technology, decentralization, and smart contracts explained, Imran Bashir,2nd Revised edition edition. Birmingham: Packt Publishing, 2018.
2. Mastering bitcoin,A. M. Antonopoulos, First edition. Sebastopol CA: O'Reilly,2015.
3. An Overview Of Blockchain Technology: Architecture, Consensus, and Future Trends,Z. Zheng, S. Xie, H. Dai, X. Chen, andH. Wang, ―2017 IEEE International Congress on Big Data (BigData Congress), 2017, pp.557–564.

# Mahatma Gandhi University
# Kottayam

<table>
<tr><td><b>Programme</b></td><td colspan="6"></td></tr>
<tr><td><b>Course Name</b></td><td colspan="6"><b>INTRODUCTION TO COMPUTER NETWORK</b></td></tr>
<tr><td><b>Type of Course</b></td><td colspan="6">MDC</td></tr>
<tr><td><b>Course Code</b></td><td colspan="6">MG2MDCCFS102</td></tr>
<tr><td><b>Course Level</b></td><td colspan="6"><b>100 -199</b></td></tr>
<tr><td><b>Course Summary</b></td><td colspan="6">Computer Networks course provides an introduction to computer networks, with a special focus on Internet architecture and protocols. Understand and apply Different cyber tools.</td></tr>
<tr><td><b>Semester</b></td><td>II</td><td colspan="3">Credits</td><td>3</td><td rowspan="2">Total Hours</td></tr>
<tr><td rowspan="2"><b>Course Details</b></td><td rowspan="2">Learning Approach</td><td>Lecture</td><td>Tutorial</td><td>Practical</td><td>Others</td></tr>
<tr><td>2</td><td>0</td><td>1</td><td>0</td><td>60</td></tr>
<tr><td><b>Pre-requisites, if any</b></td><td colspan="6"></td></tr>
</table>

## COURSE OUTCOMES (CO)

| CO No. | Expected Course Outcomes upon completion of this course , the students will be able to: | Learning Domains * | PO No |
|---|---|---|---|
| 1 | Understand the computer networks, ranging from basic definitions and models to advanced concepts | **Understand** | **1,2** |
| 2 | Analyse, and troubleshoot network communication at different layers, preparing them for roles in networking and related fields. | **Analyse** | **1,2** |
| 3 | Apply access control models and understand the intricacies of security models, contributing to their readiness for roles in cyber security and related fields. | **Apply** | **1,2,3** |
| 4 | Apply and Evaluate computer forensics tasks to investigate computer crimes, extract digital evidence | **Evaluate** | **3,4** |
| ***Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)*** | | | |

## COURSE CONTENT

### Content for Classroom transaction (Units)

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Basic network types and Topology | **2** | **1,2** |
| | 1.2 | Protocol and Standards, connecting device | **3** | **1,2** |
| | 1.3 | TCP/IP and OSI model | **5** | **1,2,4** |
| 2 | 2.1 | Error detection ,Noiseless and Noisy channel | **3** | **1,2** |
| | 2.2 | Congestion control,DNS | **3** | **1,2** |
| | 2.3 | Other protocols | **4** | **1,2** |
| 3 | 3.1 | OSI Security Architecture, Security Attacks | **3** | **1,2** |
| | 3.2 | Security mechanism and service. | **3** | **1,2** |
| | 3.3 | Access control model | **4** | **1,2,4** |
| 4 | 4.1 | Understand the basic concept of crimes, evidence, extraction, preservation, etc. | **4** | **1,2,4** |
| | 4.2 | Understand the basic concept of OS | **5** | **1,2,4** |
| | 4.3 | Data recovery tools | **8** | **1,2,3,4** |
| | 4.3 | Digital evidence control tools | **5** | **3,4** |
| | 4.4 | apply Forensic tool | **8** | **3,4** |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Evaluation is internal. | | |

| | |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture and Practical** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 15 Marks**<br>**Written Test / Seminar / Viva/ Assignments**<br>**Practical 15 Marks** |
| | **B. Semester End examination 35 Marks,Time: 1.5 hours**<br>**Written test**<br>**Practical Examination 35 Marks** |

## REFERENCES

1. Network security essentials, William Stallings, fourth edition, 2011 Pearson Education
2. Computer Networks, Andrew S. Tanenbaum, fifth Edition, 2013, Pearson Education India.
3. Data communication and Networking , Behrouz A Forouzan - Fourth Edition, McGraw Hill
4. Data and Computer Communications ,William Stallings- Eighth Edition, Prentice Hall

# SEMESTER 3

# Mahatma Gandhi University
# Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | **BSc (Hons) Cyber Forensics** | | | | | |
| **Course Name** | **INTRODUCTION TO PROGRAMMING** | | | | | |
| **Type of Course** | DSC A | | | | | |
| **Course Code** | MG3DSCCFS200 | | | | | |
| **Course Level** | **200 - 299** | | | | | |
| **Course Summary** | Acquired a solid foundation in programming, preparing them for further exploration of advanced topics and languages in the dynamic field of computer science and software development. | | | | | |
| **Semester** | III | Credits | | | 4 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 3 | 0 | 1 | | 75 |
| **Pre-requisites, if any** | | | | | | |

## COURSE OUTCOMES (CO)

| **CO No.** | **Expected Course Outcomes upon completion of this course , the students will be able to:** | **Learning Domains *** | **PO No** |
|---|---|---|---|
| 1 | Understand the basic concepts and principles of programming and introduction of object oriented concepts. | **Understand** | **1** |
| 2 | Analyse and understand C++ programming, emphasizing modular and object-oriented design principles.. | **Analyse** | **1,2** |
| 3 | Evaluate, analyse and understand the object-oriented programming principles in C++. | **Evaluate** | **1,2,3** |
| 4 | Develop a strong foundation in programming concepts and techniques object-oriented principles. | **Apply** | **3,4** |
| ****Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)*** | | | |

**COURSE CONTENT**

**Content for Classroom transaction (Units)**

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Characteristics of programming language, Flowchart, Algorithm. | **3** | **1** |
| | 1.2 | Control structure, Testing and debugging. | **4** | **1,2** |
| | 1.3 | POP and OOP concept. | **2** | **1,2** |
| | 1.4 | Simple c++ program, token, data type ,variables | **3** | **1,2** |
| | 1.5 | Operator and Operator precedence. | **3** | **1,2** |
| 2 | 2.1 | Understand the class and function | **3** | **1,2** |
| | 2.2 | Call by value and reference | **2** | **2,3** |
| | 2.3 | Member function and private member function. | **3** | **2,3** |
| | 2.4 | Friend function and array | **7** | **2,3** |
| 3 | 3.1 | Constructor ,Different type and destructor | **3** | **2,3** |
| | 3.2 | Operator overloading (unary and binary) and rules | **3** | **3** |
| | 3.3 | Inheritance, Derived class and the visibility mode | **3** | **1,3** |
| | 3.4 | Different type of inheritance, virtual base class, constructor in derived class | **6** | **1,2,4** |
| 4 | 4.1 | simple program and program using control structure | **5** | **1,2,3,4** |
| | 4.2 | Program based functions and recursion | **5** | **1,3,4** |

| | | | | |
|---|---|---|---|---|
| | 4.3 | Program based on array , Function overloading. | **5** | **1,3,4** |
| | 4.4 | Program based on operator overloading(Unary and binary) | **5** | **1,3,4** |
| | 4.5 | Program based on member function, Friend function | **3** | **1,2,3** |
| | 4.6 | Program based on constructor and inheritance. | **7** | **1,3,4** |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Evaluation is internal. | | |

| | |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture and Practical** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 25 Marks**<br>**Written Test / Seminar / Viva/ Assignments**<br>**Practical 15 Marks** |
| | **B. Semester End examination 50 Marks, Time 1.5 hours**<br>**Written test**<br>**Practical Examination 35 Marks** |

**REFERENCE**

1. Object oriented Programming with ANSI & Turbo C++,Ashok N. Kamthane, First Edition, 2011, Pearson India.
2. Computer Fundamentals,P K Sinha&PritiSinha, Reprint 2018, BPB Publications.
3. Object Oriented Programming with C++,E. Balagurusamy , Fifth edition, Tata McGraw Education Hill, 2011.
4. Programming in C,Ashok Kamthane Third Edition, 2015, Pearson Education.
5. Object Oriented Programming in Turbo C++,Robert Lafore,1991, First Edition, Galgotia Publications.
6. Programming with C++,D Ravichandran, Second edition, 2002, Tata McGraw- Hill.

# Mahatma Gandhi University
# Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | **BSc (Hons) Cyber Forensics** | | | | | |
| **Course Name** | **COMPUTER ORGANIZATION** | | | | | |
| **Type of Course** | DSC A | | | | | |
| **Course Code** | MG3DSCCFS201 | | | | | |
| **Course Level** | **200 - 299** | | | | | |
| **Course Summary** | To provide a solid foundation in the organization and architecture of computer systems, preparing them for more advanced topics in computer science and engineering. | | | | | |
| **Semester** | III | Credits | | | 4 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 3 | 0 | 1 | | 75 |
| **Pre-requisites, if any** | | | | | | |

**COURSE OUTCOMES (CO)**

| CO No. | Expected Course Outcomes upon completion of this course , the students will be able to: | Learning Domains * | PO No |
|---|---|---|---|
| 1 | Understand basic functional units of a computer | Understand | 1 |
| 2 | Analyse the internal workings of the CPU and explore the impact of program control on overall system performance. | Analyse | 1,2 |
| 3 | Evaluate different types of memory and their impact on overall system performance. | Evaluate | 1,2 |
| 4 | Apply the fundamental concepts of the processing unit and input/output organization to solve practical problems in computer architecture and system design. | Apply | 1,2,3 |
| ****Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)*** | | | |

## COURSE CONTENT

### Content for Classroom transaction (Units)

| Module | Units | Course description | Hrs. | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Introduction: Parts of Computer System- Hardware, Software, Data, Users, Functional units | 5 | 1 |
| | 1.2 | Basic operational concepts, Bus structures,memory Locations and address ,memory operations | 5 | 1 |
| | 1.3 | Instruction execution and straight line sequencing, branching | 2 | 1 |
| 2 | 2.1 | Central Processing Unit: General Register Organization, Stack Organization, Addressing Modes | 8 | 1,2 |
| | 2.2 | Instruction Classification, Program control. | 8 | 1,2 |
| 3 | 3.1 | Memory Hierarchy, Main Memory, Organization of RAM, SRAM, DRAM, Read Only Memory ROM-PROM,EPROM,EEPROM, Auxiliary memory, Cache memory, | 9 | 1,2 |
| | 3.2 | Processing unit: Fundamental concepts, register transfers, performing an arithmetic or logic operations, fetching a word in memory, execution of a complete instruction | 8 | 1,2 |
| 4 | 4.1 | Identification of computer hardware parts.<br>This hands-on activity helps them identify various hardware parts such as the CPU, RAM, hard drive, motherboard, power supply unit (PSU), and cooling components etc<br>Component Identification: Provide a set of hardware | 15 | 1,2,3 |

| | | | | |
|---|---|---|---|---|
| | | components (e.g., CPU, RAM, motherboard, storage drives) and have students identify each component, including its purpose, form factor, and key specifications. | | |
| | 4.2 | Assembly language programming to comprehend the instruction set and addressing modes of a processor utilizing an 8-bit or 16-bit microprocessor.<br>1. Assembly language program for performing Arithmetic operations using two 8 bit and 16 bit numbers<br>2. Assembly language program to find Sum of N numbers.<br>3. Assembly language program to find factorial of number<br>4. Assembly language program to find Average of N numbers | 15 | 1,2,3 |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Valuation is internal. | | |

| | |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture and Practical** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 25 Marks**<br>**Written Test / Seminar / Viva/ Assignments**<br>**Practical 15 Marks** |
| | **B. Semester End examination 50 Marks Time: 1.5 hours**<br>**Written test**<br>**Practical Examination 35 Marks** |

## REFERENCES

1. Computer Systems Architecture, M.Morris Mano-Third Edition, Pearson Education
2. Introduction on Computers Peter Norton, Sixth Edition, 2008, TataMcGraw Hill
3. Computer Organization- Hamacher VranesicZaky, Fifth Edition, 2011, Tata McGraw-Hill
4. Computer Fundamentals, P K Sinha & Priti Sinha, Fourth Edition, Reprint 2018, BPB Publications
5. Introduction to Computer Science, Fouthimpression, 2009, ITL Education Solutions limited.
6. Structured Computer Organisation, AndrewsTannenbaum, Sixthedition, 2016,Pearson
7. Computer Organisation and Architecture, William Stallings, Seventh edition, Fourth impression 2009, Pearson education.

# Mahatma Gandhi University
# Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | **BSc (Hons) Cyber Forensics** | | | | | |
| **Course Name** | **TCP/IP AND NETWORK SECURITY** (Network Security Specialization) | | | | | |
| **Type of Course** | **DSE** | | | | | |
| **Course Code** | MG3DSECFS200 | | | | | |
| **Course Level** | **200 - 299** | | | | | |
| **Course Summary** | Able to design, implement and secure network infrastructure while being of emerging threats in network security | | | | | |
| **Semester** | III | Credits | | | 4 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 4 | 0 | 0 | | 60 |
| **Pre-requisites, if any** | | | | | | |

COURSE OUTCOMES (CO)

| CO No. | Expected Course Outcomes upon completion of this course , the students will be able to: | Learning Domains * | PO No |
|---|---|---|---|
| 1 | Recognize in depth TCP/IP and Network fundamentals | Understand | 1 |
| 2 | Analyse network security fundamentals and classify the role of firewall in network security | Analyse | 1,2 |
| 3 | Apply Cryptography principles and secure communication | Apply | 2 |
| 4 | Evaluate TCP/IP protocol, services and network security | Evaluate | 2,3 |

****Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)***

## COURSE CONTENT

### Content for Classroom transaction (Units)

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Introduction: Types of computer Networks | 5 | 1 |
| | 1.2 | Reference Models:ISO-OSI, TCP/IP. | 5 | 1 |
| | 1.3 | Protocol Hierarchies: Network layer, Transport layer, Application layer | 5 | 1,2 |
| 2 | 2.1 | The OSI Security Architecture: security attacks, security services, security mechanisms | 5 | 2,3 |
| | 2.2 | A Model for Network Security- Access Control Models: Chinese Wall, Clark-Wilson, Bell-LaPadula, Non Interference and Role Base Model. | 3 | 2,3 |
| | 2.3 | Intruders: Intruders, Intrusion Detection, Password Management | 3 | 3 |
| | 2.4 | Firewalls: The Need for Firewalls, Firewall Characteristics, Types of Firewalls, Firewall Basing, Firewall Location and Configurations. | 4 | 3,4 |
| 3 | 3.1 | Symmetric Encryption Principles: Symmetric Block Encryption Algorithms | 4 | 2,3 |
| | 3.2 | Public-Key Cryptography Principles: Public-Key Cryptography Algorithms | 5 | 2,3 |
| | 3.3 | Key Distribution and User Authentication: Symmetric Key Distribution Using Symmetric Encryption, Kerberos, Key Distribution Using Asymmetric Encryption,X.509 Certificates, Public-Key Infrastructure. | 6 | 3,4 |
| 4 | 4.1 | Transport-Level Security: Web Security Considerations, Secure Socket Layer and Transport Layer Security, HTTPS, Secure Shell (SSH). | 6 | 3,4 |
| | 4.2 | IP Security: IP Security Overview, IP Security Policy, Encapsulating Security | 6 | 3,4 |

| | | | | |
|---|---|---|---|---|
| | | Payload, Combining Security Associations, Internet Key Exchange . | | |
| | 4.3 | Electronic Mail Security: Pretty Good Privacy, S/MIME | 3 | 3,4 |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Evaluation is internal. | | |

| | |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 30 Marks**<br>**Written Test / Seminar / Viva/ Assignments** |
| | **B. Semester End examination 70 Marks Time: 2 hours**<br>**Written test** |

**Text Books**

1. Network security essentials, William Stallings, 4th edition, 2011 Pearson Education
2. Computer Networks, Andrew S. Tanenbaum, 5th Edition, 2013, Pearson Education India.
3. Data communications and networking, Behrouz A. Forouzan, 2017,McGraw Hill Education.

**References**

1. Networking: Principles, Protocols, and Practice" by Olivier Bonaventure
2. "TCP/IP Illustrated, Volume 1: The Protocols" by W. Richard Stevens
3. " Computer Cryptography and Network Security: Principles and Practice" by William Stallings

   "Hacking: The Art of Exploitation" by Jon Erickson (for understanding security from an offensive perspective)

# Mahatma Gandhi University Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | **BSc (Hons) Cyber Forensics** | | | | | |
| **Course Name** | **OPERATING SYSTEMS** (Operating System Architecture Specialization) | | | | | |
| **Type of Course** | **DSE** | | | | | |
| **Course Code** | MG3DSECFS201 | | | | | |
| **Course Level** | **200 -299** | | | | | |
| **Course Summary** | Aim the comprehensive understanding of operating systems, enabling them to design, implement, and manage systems effectively. | | | | | |
| **Semester** | III | Credits | | | 4 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 4 | 0 | 0 | | 60 |
| **Pre-requisites, if any** | | | | | | |

**COURSE OUTCOMES (CO)**

| CO No. | Expected Course Outcomes upon completion of this course , the students will be able to: | Learning Domains * | PO No |
|---|---|---|---|
| 1 | Analyse the basic concept of process, Threads ,CPU scheduling, Scheduling criteria, Analyse CPU scheduling algorithms, Critical sections problems. | Analyse | 1 |
| 2 | Understand and Analyse Deadlock, Deadlock prevention ,Avoidance, contiguous memory allocation, paging segmentation, Demand paging, Page replacement techniques | Analyse | 1,2 |
| 3 | Analyse different Types of file access methods and Allocation | Analyse | 1,2,4 |
| 4 | Make use of Linux OS, File System, Different Editors | Understand | 1 |
| ****Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)*** | | | |

## COURSE CONTENT

### Content for Classroom transaction (Units)

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Definition and Functions of OS, Types of Operating Systems-Batch OS, Multi programming OS, Time Sharing OS, Real time OS, Distributed OS, POST, Bootstrapping. | 4 | 1 |
|  | 1.2 | Process management: process concept, process scheduling, operations on processes, cooperating processes. | 8 | 1,3 |
|  | 1.3 | Threads-overview And Benefits , CPU scheduling, scheduling criteria, CPU scheduling algorithms, process synchronization, critical-section problem semaphores. | 6 | 1,3 |
| 2 | 2.1 | Deadlocks-Characterization,Resource Allocation Graph, Dead lock prevention and avoidance . | 8 | 1,3 |
|  | 2.2 | Memory management, contiguous memory allocation, paging, segmentation, segmentation with paging. | 6 | 1,3 |
|  | 2.3 | Virtual memory, demand paging, page replacement. | 4 | 1,3 |
| 3 | 3.1 | File System- Access Methods-Sequential, Direct, Other access methods. Allocation Methods-Contiguous allocation, Linked Allocation, Indexed Allocation | 5 | 1,3 |
|  | 3.2 | Directory Structure-Single- level Directory, Two- level Directory, Tree -structured directories. | 4 | 1,3 |
|  | 3.3 | I/O systems-Kernel I/O subsystem-I/O Scheduling, Buffering, caching, Spooling. | 5 | 1,4 |

|  |  |  |  |  |
|---|---|---|---|---|
| 4 | 4.1 | Linux Operating System: Architecture, Features of Linux OS, Types of shells available in Linux, hardware requirements for Linux | 3 | 1 |
|  | 4.2 | Linux File system, Types of files in Linux- Ordinary,Directory, special files, Types of Users, | 3 | 1 |
|  | 4.3 | Types of Editors- gedit,vi,emacs,Joe,pico, Functions Of text editors. Introduction to GNOME and KDE-GNOME Desktop, KDE desktop. | 4 | 1 |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Evaluation is internal. |  |  |

|  |  |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 30 Marks**<br>**Written Test / Seminar / Viva/ Assignments** |
|  | **B. Semester End examination 70 Marks Time: 2 hours**<br>**Written test** |

## REFERENCES

1. Operating system Concepts-Sixth Edition- Silberschatz,Galvin,Gange- Wiley India Edition
2. Linux -The Complete Reference-Sixth Edition-TATA McGraw-Hill Edition
3. Milan Kovic - Operating Systems, 2ndEdition, (TMH )
4. William Stallings - Operating Systems, Sixth Edition, Prentice Hall of India, Pearson
5. Cristopher Negus - Red Hat Linux Bible, Wiley Dreamtech India 2005 edition.

# Mahatma Gandhi University
# Kottayam

<table>
<tr><td><b>Programme</b></td><td colspan="6"><b>BSc (Hons) Cyber Forensics</b></td></tr>
<tr><td><b>Course Name</b></td><td colspan="6"><b>PARALLEL PROCESSING</b> (Modern Computing with Resource Sharing Specialization)</td></tr>
<tr><td><b>Type of Course</b></td><td colspan="6"><b>DSE</b></td></tr>
<tr><td><b>Course Code</b></td><td colspan="6">MG3DSECFS202</td></tr>
<tr><td><b>Course Level</b></td><td colspan="6"><b>200 - 299</b></td></tr>
<tr><td><b>Course Summary</b></td><td colspan="6">Aims is to provide in designing, implementing, and optimizing parallel programs for various architectures.</td></tr>
<tr><td><b>Semester</b></td><td>III</td><td colspan="3">Credits</td><td>4</td><td rowspan="2">Total Hours</td></tr>
<tr><td rowspan="2"><b>Course Details</b></td><td rowspan="2">Learning Approach</td><td>Lecture</td><td>Tutorial</td><td>Practical</td><td>Others</td></tr>
<tr><td>4</td><td>0</td><td>0</td><td>0</td><td>60</td></tr>
<tr><td><b>Pre-requisites, if any</b></td><td colspan="6"></td></tr>
</table>

**COURSE OUTCOMES (CO)**

| CO No. | Expected Course Outcomes upon completion of this course , the students will be able to: | Learning Domains * | PO No |
|---|---|---|---|
| 1 | Recognize the Parallel Processing System | Understand | 1 |
| 2 | Analyse the principles of pipelining and vector processing. | Analyse | 2 |
| 3 | Familiarise the structures and algorithms for array processor. | Understand | 1 |
| 4 | analyse multiprocessor architecture and programming | Analyse | 1 |
| ***Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)*** | | | |

**COURSE CONTENT**

**Content for Classroom transaction (Units)**

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Evaluation of computer system | 1 | 1 |
| | 1.2 | Parallelism in uniprocessor systems | 2 | 1 |
| | 1.3 | Parallel computer structures | 2 | 1 |
| | 1.4 | Architectural classification schemes | 2 | 1 |
| | 1.5 | Parallel processing Applications | 2 | 1 |
| 2 | 2.1 | Linear pipelining | 2 | 2 |
| | 2.2 | Classification of pipeline processors | 2 | 2 |
| | 2.3 | Instruction and arithmetic pipelines | 2 | 2 |
| | 2.4 | Principles of designing pipelined processors | 2 | 2 |
| | 2.5 | Introduction to vector processing | 2 | 2 |
| | 2.6 | Pipelined vector processing methods | 2 | 2 |
| 3 | 3.1 | SIMD Array Processors | 3 | 3 |
| | 3.2 | SIMD Interconnection Networks | 3 | 3 |
| | 3.3 | Parallel Algorithms for array processors | 3 | 3 |
| 4 | 4.1 | Functional Structures of Multiprocessor Systems | 2 | 4 |
| | 4.2 | Interconnection Networks. | 3 | 4 |

| | | | | |
|---|---|---|---|---|
| | 4.3 | Multiprocessor Operating Systems | 3 | 4 |
| | 4.4 | Inter-processor Communication Mechanisms | 2 | 4 |
| | 4.5 | Dataflow computers | 5 | 4 |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Valuation is internal. | | |

| | |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 30 Marks**<br>**Written Test / Seminar / Viva/ Assignments** |
| | **B. Semester End examination 70 Marks, Time: 2 hours**<br>**Written test** |

**References**

1. Computer Architecture and parallel processing-Kai Hwang and F A Briggs.
2. Introduction to Computer Architecture, Stone H S, Galgotia publishers
3. The Architecture of pipelined computers – KoggiH, McGraw Hill

# Mahatma Gandhi University
# Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | **BSc (Hons) Cyber Forensics** | | | | | |
| **Course Name** | **COMPUTER SECURITY** | | | | | |
| **Type of Course** | DSC B | | | | | |
| **Course Code** | MG3DSCCFS202 | | | | | |
| **Course Level** | **200 - 299** | | | | | |
| **Course Summary** | Aim to equip students the knowledge and skills needed to analyze, implement, and manage effective security measures in various computing environments. The course often emphasizes a combination of theory and hands-on experience to prepare students for the dynamic and constantly evolving field of computer security. | | | | | |
| **Semester** | III | Credits | | | 4 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 3 | 0 | 1 | | 75 |
| **Pre-requisites, if any** | | | | | | |

## COURSE OUTCOMES (CO)

| CO No. | Expected Course Outcomes upon completion of this course , the students will be able to: | Learning Domains * | PO No |
|---|---|---|---|
| 1 | Understanding of computer Security Concepts | Understand | 1 |
| 2 | Analyse network vulnerabilities, attacks and security | Analyse | 1,2 |
| 3 | Apply secure coding practices and analyse application security | Apply | 2 |
| 4 | Evaluate security in different operating system and provide security that is resilient to common security vulnerabilities. | Evaluate | 2,3 |
| ****Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)*** | | | |

## COURSE CONTENT

### Content for Classroom transaction (Units)

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Overview of computer security concepts-Types of security threats (e.g., malware, phishing, hacking) | 5 | 1 |
| | 1.2 | Security goals: confidentiality, integrity, availability | 3 | 1 |
| | 1.3 | Basic cryptography principles | 3 | 1,2 |
| | 1.4 | Security policies and models | 4 | 2,3 |
| 2 | 2.1 | Network vulnerabilities and attacks | 2 | 1 |
| | 2.2 | Firewalls and intrusion detection/ prevention systems | 3 | 1,3 |
| | 2.3 | Virtual Private Networks (VPNs) | 3 | 2 |
| | 2.4 | Secure Socket Layer (SSL) and Transport Layer Security (TLS) | 4 | 2 |
| | 2.5 | Network security protocols (e.g., IPsec) | 3 | 2 |
| 3 | 3.1 | Understanding Web application security | 4 | 1 |
| | 3.2 | Apply Secure coding practices | 3 | 3 |
| | 3.3 | Database security | 3 | 2 |
| | 3.4 | Mobile app security | 2 | 2 |
| | 3.5 | Security in cloud computing. | 3 | 2 |
| 4 | 4.1 | Access controls and permissions | 4 | 1,3 |
| | 4.2 | User authentication mechanisms | 3 | 2 |
| | 4.3 | Analyse File system security | 3 | 2 |

| | | | | |
|---|---|---|---|---|
| | 4.4 | Security in different operating systems (e.g., Windows, Linux, MacOS) | 4 | 2,3 |
| | 4.5 | Evaluate Security updates and patches | 3 | 2,3 |
| | 4.6 | Installing and Configuring Windows Firewall | 6 | 3 |
| | 4.7 | Installing and Configuring Linux Firewall (Iptables) | 7 | 3 |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Evaluation is internal. | | |

| | |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture and Practical** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 25 Marks**<br>**Written Test / Seminar / Viva/ Assignments**<br>**Practical 15 Marks** |
| | **B .Semester End examination 50 Marks Time: 2 hours**<br>**Written test**<br>**Practical Examination 35 Marks** |

**References :**

**1.** Computer Security: Principles and Practice" by William Stallings and Lawrie Brown,3rd edition

**2.** Network Security Essentials" by William Stallings , 4th edition

**3.** The Web Application Hacker's Handbook" by Dafydd Stuttard and Marcus Pinto ,2nd edition

4. Operating System Concepts" by Abraham Silberschatz, Peter B. Galvin, and Greg Gagne,10th edition

**SUGGESTED READINGS**

**1.** Cryptography and Network Security: Principles and Practice" by William Stallings

**2.** Introduction to Computer Security" by Michael T. Goodrich and Roberto Tamassia

**3.** Computer Security: Art and Science" by Matt Bishop

# Mahatma Gandhi University
# Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | | | | | | |
| **Course Name** | **E-WASTE MANAGEMENT AND RECYCLING** | | | | | |
| **Type of Course** | VAC | | | | | |
| **Course Code** | MG3VACCFS200 | | | | | |
| **Course Level** | **200 -299** | | | | | |
| **Course Summary** | Aim to attain the knowledge and skills needed to contribute to sustainable e-waste management and recycling efforts, both at the local and global levels. | | | | | |
| **Semester** | III | Credits | | | 3 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 3 | 0 | 0 | | 45 |
| **Pre-requisites, if any** | | | | | | |

COURSE OUTCOMES (CO)

| CO No. | Expected Course Outcomes upon completion of this course , the students will be able to: | Learning Domains * | PO No |
|---|---|---|---|
| 1 | Recognize E-Waste | Understand | 1 |
| 2 | Analyse the environmental consequences of improper E-waste disposal | Analyse | 1 |
| 3 | Apply skills to communicate E-waste management | Apply | 2 |
| 4 | Evaluate real world case studies to gain practical successful E-Waste management. | Evaluate | 2 |
| ***Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)*** | | | |

**COURSE CONTENT**

**Content for Classroom transaction (Units)**

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Introduction- Types of contaminants in E-waste, Treatment strategies | 4 | 1 |
| | 1.2 | Landfill disposal, Biological treatment, Advanced methods | 2 | 2 |
| | 1.3 | Urban mining E-waste for metals: -Physical Techniques-Chemical techniques | 4 | 2 |
| | 1.4 | Extraction of nanometals from E-waste-Pure metals- Metal oxides Metal nanocomposites | 4 | 4 |
| 2 | 2.1 | Mechanisms in phytoremediation | 4 | 4 |
| | 2.2 | Phytoremediation approaches for different contaminants | 3 | 2 |
| | 2.3 | Advancement of phytoremediation for remediation of E-waste contaminated sites | 1 | 3 |
| | 2.4 | Advantages associated with phytoremediation for E-waste contaminated sites. | 4 | 1 |
| | 2.5 | limitations | 3 | 1 |
| | 2.6 | phytoremediation for E-waste contaminated sites. | 4 | 3 |
| 3 | 3.1 | Waste electronic and electrical equipment types | 4 | 1 |
| | 3.2 | Metallic components in E-waste | 4 | 1 |
| | 3.3 | Hydrometallurgical recovery methods | 4 | 3 |
| | 3.4 | Electrowinning and electrorefining processes | 4 | 3 |
| 4 | 4.1 | Electrolysis, Adsorption-desorption | 3 | 1 |

| | | | | |
|---|---|---|---|---|
| | 4.2 | Precipitation-dissolution, Oxidation-reduction | 4 | 3 |
| | 4.3 | Advantages of the electrokinetic remediation technique, Disadvantages and challenges | 2 | 4 |
| | 4.4 | Electrokinetic remediation for the removal of organic waste. | 2 | 4 |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Valuation is internal. | | |

| | |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 25 Marks**<br>**Written Test/ Assignment/Viva/Seminar** |
| | **B. Semester End examination 50 Marks Time: 1.5 hours**<br>**Written Test** |

**TEXT BOOKS :**

1. Electronic Waste Management International Best Practices and Case Studies by Majeti Narasimha Vara Prasad, Meththika Vithanage, Anwesha Borthakur, First edition,2020, Elsevier publication

**REFERENCES :**

1. "E-Waste Management: From Waste to Resource" by R. E. Hester, R. M. Harrison, First edition,2010, Royal Society of Chemistry publication
2. "E-Waste in Transition: From Pollution to Resource" by Florin-Constantin Mihai, Publication Academic Press, First edition, 2016.
3. Electronic Waste: From Cradle to Grave by Ruediger Kuehr and Eric Williams, Publisher CRC Press, First edition, 2013.
4. Electronic Waste Management: A Case Study of Lagos State, Nigeria Author: Oladele Osibanjo, Maruf Sanni, and Kehinde Ojedokun, Publisher: Springer, First edition,2018.

# SEMESTER 4

# Mahatma Gandhi University
# Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | **BSc (Hons) Cyber Forensics** | | | | | |
| **Course Name** | **DATA STRUCTURE USING C++** | | | | | |
| **Type of Course** | **DSC A** | | | | | |
| **Course Code** | MG4DSCCFS200 | | | | | |
| **Course Level** | **200 – 299** | | | | | |
| **Course Summary** | This course is designed to provide a comprehensive understanding of fundamental data structures and algorithms using the C++ programming language. Participants will learn how to implement and utilize various data structures to solve complex problems efficiently. | | | | | |
| **Semester** | IV | Credits | | | 4 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 3 | 0 | 1 | | 75 |
| **Pre-requisites, if any** | | | | | | |

**COURSE OUTCOMES (CO)**

| CO No. | Expected Course Outcomes upon completion of this course, the students will be able to: | Learning Domains * | PO No |
|---|---|---|---|
| 1 | Recognize the basic of data structure. | Understand | 1 |
| 2 | Analyse applications of stack, queue | Analyse | 1,2 |
| 3 | Analyse applications of linked list | Apply | 1,2 |
| 4 | Design, implement, and deliver programs in data structure | Create | 1,2,3 |

***Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)***

**COURSE CONTENT**

**Content for Classroom transaction (Units)**

| Module | Units | Course description | Hrs. | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Introduction to Data Structures, Basic Terminology, Data Structure Operations; Array: | 7 | 1 |
| | 1.2 | Introduction, Linear Arrays, Representation of Linear Arrays in Memory, Multidimensional Arrays. | 8 | 1 |
| 2 | 2.1 | Stack: Introduction, Array Representation and Basic Operations; Implementation of Stacks. | 5 | 1,2 |
| | 2.2 | Application of Stacks, Evaluating Arithmetic Expression using Stacks, Infix to Postfix Notation, | 6 | 1,2 |
| | 2.3 | Queue: Introduction, Implementation of Queue, Priority Queue, Dequeue, Linked List: Introduction, Representation of Linked List, operations in Linked List, Doubly and Circular Linked List. | 6 | 1,2 |
| 3 | 3.1 | Trees - Introduction, Binary Trees, Representation, Traversing and its Algorithms, AVL tree | 5 | 1,2 |
| | 3.2 | Sorting: Bubble sort, Insertion sort, Selection sort<br>Searching: Linear Search, Binary Search | 8 | 1,2 |
| 4 | 4.1 | Part I<br>1. Stack Implementation<br>2. Linked list<br>3.Queue | 15 | 1,2,3 |
| | 4.2 | Part II<br>1. Sorting<br>2. Searching | 15 | 1,2,3 |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, | | |

| | | | | |
|---|---|---|---|---|
| | | practical session, field visit etc as specified by the teacher concerned.<br>Evaluation is internal. | | |

| | |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture and Practical** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 25 Marks**<br>**Written Test / Seminar / Viva/ Assignments**<br>**Practical 15 Marks** |
| | **B. Semester End examination 50 Marks Time: 1.5 hours**<br>**Written test**<br>**Practical Examination 35 Marks** |

**REFERENCES**

1. Schaum's Outline Series: Theory and Problems of Data Structures- Seymour Lipschutz,1986,McGraw- Hill.
2. Data Structures and Algorithms in C++, Goodrich Michael T, Second edition, 2016,Wiley.
3. Data structures and Algorithm Analysis in C++, Mark Allen Weiss, Third edition, 2007,Pearson Education India.
4. Data Structures, Seymour Lipschutz, Revised First edition, 2014, McGraw Hill Education.

# Mahatma Gandhi University
# Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | **BSc (Hons) Cyber Forensics** | | | | | |
| **Course Name** | **APPLIED CRYPTOGRAPHY** | | | | | |
| **Type of Course** | **DSC A** | | | | | |
| **Course Code** | MG4DSCCFS201 | | | | | |
| **Course Level** | **200 -299** | | | | | |
| **Course Summary** | "Applied Cryptography" is a field of study that focuses on the practical application of cryptographic techniques to secure communication, data integrity, and user authentication. | | | | | |
| **Semester** | IV | Credits | | | 4 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 3 | 0 | 1 | | 75 |
| **Pre-requisites, if any** | | | | | | |

**COURSE OUTCOMES (CO)**

| CO No. | Expected Course Outcomes upon completion of this course , the students will be able to: | Learning Domains * | PO No |
|---|---|---|---|
| 1 | Recognize the fundamental concepts of cryptography. | Understand | 1 |
| 2 | Analyse secure coding practices with cryptographic algorithms to prevent vulnerabilities. | Analyse | 1 |
| 3 | Apply cryptographic techniques to secure network communication. | Apply | 2 |
| 4 | Implementation of cryptography | Create | 2 |

***Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)***

## COURSE CONTENT

### Content for Classroom transaction (Units)

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Definition and historical development-Basic cryptographic terminology | 3 | 1 |
| | 1.2 | Applications of cryptography in modern computing | 3 | 3 |
| | 1.3 | Cryptographic Primitives: Symmetric key cryptography vs. asymmetric key cryptography | 4 | 2 |
| | 1.4 | Hash functions and their applications | 5 | 4 |
| 2 | 2.1 | Symmetric Key Algorithms: Data Encryption Standard (DES) | 3 | 2 |
| | 2.2 | Advanced Encryption Standard (AES) | 2 | 4 |
| | 2.3 | Stream ciphers and block ciphers. | 1 | 2 |
| | 2.4 | Block Cipher Modes of Operation | 3 | 4 |
| | 2.5 | Electronic Codebook (ECB) | 3 | 4 |
| | 2.6 | Cipher Block Chaining (CBC). | 3 | 4 |
| 3 | 3.1 | Public Key Infrastructure (PKI): Digital signatures, certificates, and Certificate Authorities | 2 | 3 |
| | 3.2 | Public key algorithms: RSA<br>Diffie-Hellman Key Exchange: Key exchange protocols | 4 | 3 |
| | 3.3 | Cryptographic Hash Functions: Secure Hash Algorithm (SHA) family | 7 | 4 |
| | 3.4 | Message Authentication Codes: HMAC | 2 | 2 |

|  |  |  |  |  |
|---|---|---|---|---|
| 4 | 4.1 | Write a JAVA program to implement the DES algorithm logic.<br>Write a JAVA program to implement the AES algorithm logic. | 8 | 4 |
|  | 4.2 | Write a JAVA program to implement the RSA algorithm logic. | 6 | 3 |
|  | 4.3 | Write a JAVA program to implement the MD5 algorithm logic. | 8 | 4 |
|  | 4.4 | Write a program to implement stegnography-image, audio, video | 8 | 4 |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Evaluation is internal. |  |  |

|  |  |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture and Practical** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 25 Marks**<br>**Written Test / Seminar / Viva/ Assignments**<br>**Practical 15 Marks** |
|  | **B. Semester End examination 50 Marks Time: 1.5 hours**<br>**Written test**<br>**Practical Examination 35 Marks** |

## REFERENCES

1. "Cryptography and Network Security: Principles and Practice" by William Stallings
2. "Applied Cryptography: Protocols, Algorithms, and Source Code In C" by Bruce Schneier
3. "Serious Cryptography: A Practical Introduction to Modern Encryption " by Jean-Philippe Aumasson

4. "Understanding Cryptography: A Textbook for Students and Practitioners" by Christof Paar, Jan Pelzl first Edition ,2009, springer

**SUGGESTED READINGS**

1. "Cryptography Engineering: Design Principles and Practical Applications" by Niels Ferguson, Bruce Schneier, Tadayoshi Kohno
2. "Handbook of Applied Cryptography" by Alfred J. Menezes, Paul C. van Oorschot, Scott A. Vanstone
3. "Public-Key Cryptography: Theory and Practice “by Jonathan Katz, Yehuda Linde

# Mahatma Gandhi University
# Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | **BSc (Hons) Cyber Forensics** | | | | | |
| **Course Name** | **VIRTUAL PRIVATE NETWORK SECURITY** (Network Security Specialization) | | | | | |
| **Type of Course** | **DSE** | | | | | |
| **Course Code** | MG4DSECFS200 | | | | | |
| **Course Level** | **200 - 299** | | | | | |
| **Course Summary** | Able to comprehensive understanding of VPN security, equipping them with the skills needed to design, implement, and maintain secure VPN solutions in various organizational settings. | | | | | |
| **Semester** | IV | Credits | | | 4 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 4 | 0 | 0 | | 60 |
| **Pre-requisites, if any** | | | | | | |

**COURSE OUTCOMES (CO)**

| CO No. | Expected Course Outcomes upon completion of this course , the students will be able to: | Learning Domains * | PO No |
|---|---|---|---|
| 1 | Understand the fundamental concepts of Virtual Private Networks. | Understand | 1 |
| 2 | Analyse the principles and applications of encryption algorithms in VPNs. | Analyse | 1,2 |
| 3 | Implement role- based access control for VPN user management. | Apply | 1,2,3 |
| 4 | Make use of various user authentication methods in the context of VPNs | Evaluate | 2,3 |

***Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)***

**COURSE CONTENT**

**Content for Classroom transaction (Units)**

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Overview of Virtual Private Networks (VPNs),Types of VPNs: Site-to-Site, Remote Access, SSL/TLS VPNs | 5 | 1 |
|  | 1.2 | Importance of VPN Security<br>Security Fundamentals: Encryption, Authentication, Integrity | 5 | 1,2 |
|  | 1.3 | Threats to VPNs: Eavesdropping, Man-in-the-Middle Attacks | 5 | 1,2 |
| 2 | 2.1 | VPN Protocols: IPSec, SSL/TLS, PPTP, L2TP | 5 | 2 |
|  | 2.2 | Encryption Algorithms: DES, 3DES, AES | 5 | 2,3 |
|  | 2.3 | Key Exchange Mechanisms: IKEv1, IKEv2 | 5 | 2,3 |
| 3 | 3.1 | User Authentication Methods: Passwords, Certificates, Two-Factor Authentication | 5 | 1 |
|  | 3.2 | VPN User Management: Role-Based Access Control | 5 | 3 |
|  | 3.3 | Integration with LDAP and RADIUS, Network Access Control (NAC) in VPNs | 5 | 2,3 |
| 4 | 4.1 | VPN Design Considerations | 5 | 3 |
|  | 4.2 | Site-to-Site VPN Deployment, Remote Access VPN Deployment | 5 | 3 |
|  | 4.3 | Security Considerations for VPN Gateways,VPN Performance Optimization | 5 | 2 |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, |  |  |

| | | | | |
|---|---|---|---|---|
| | | field visit etc as specified by the teacher concerned.<br>Evaluation is internal. | | |

| | |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 30 Marks**<br>**Written Test / Seminar / Viva/ Assignments** |
| | **B. Semester End examination 70 Marks Time: 2 hours**<br>**Written test** |

**References :**

1. ”Virtual Private Networks” by Charlie Scott and Paul Wolfe , 2nd edition
2. “Virtual Private Networks: Technologies and Solutions” by Ruixi Yuan, W. Timothy Strayer ,2011
3. Network Security Essentials” by William Stallings,4th edition,2011
4. “Deploying Virtual Private Networks with Microsoft Windows Server 2003” by Joseph Davies

**SUGGESTED READINGS**

**1. "SSL and TLS: Designing and Building Secure Systems" by Eric Rescorla**
**2. "Virtual Private Networks: Making the Right Connection" by Mark Norris, Weidong Wu, and Mark Turner**

# Mahatma Gandhi University Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | **BSc (Hons) Cyber Forensics** | | | | | |
| **Course Name** | **LINUX ADMINISTRATION** (Operating System Architecture Specialization) | | | | | |
| **Type of Course** | **DSE** | | | | | |
| **Course Code** | MG4DSECFS201 | | | | | |
| **Course Level** | **200 - 299** | | | | | |
| **Course Summary** | To provide a solid foundation in Linux, enabling them to effectively use, administer, and troubleshoot Linux-based systems in various contexts. | | | | | |
| **Semester** | IV | Credits | | | 4 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 4 | 0 | 0 | | 60 |
| **Pre-requisites, if any** | | | | | | |

**COURSE OUTCOMES (CO)**

| CO No. | Expected Course Outcomes upon completion of this course , the students will be able to: | Learning Domains * | PO No |
|---|---|---|---|
| 1 | Understand architecture of Linux OS ,Shell types,Linux file system and different Editors. | Understand | 1 |
| 2 | Analyse Directory commands, File Commands, Filter commands, Process related commands, Disk related commands. | Analyse | 1,2 |
| 3 | Analyse and Evaluate shell script, Parameter Handling, Control Structures | Analyse, Evaluate | 1,2 |
| 4 | Analyse and Evaluate User management commands, package management, and various servers | Analyse, Evaluate | 1,2,4 |
| ***Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)*** | | | |

## COURSE CONTENT

### Content for Classroom transaction (Units)

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | History Of Linux and UNIX, Open source Software, Architecture, Features of Linux OS, Types of shells available in Linux, hardware requirements for Linux | 4 | 1 |
| | 1.2 | Linux File system, Types of files in Linux- Ordinary, Directory, special files | 3 | 1 |
| | 1.3 | Types of Users, Types of Editors-gedit,vi,emacs,Joe,pico, Functions Of text editors. | 3 | 1 |
| 2 | 2.1 | Managing directories-mkdir,rmdir,ls,cd,pwd. Basic file commands-cat, more, less, cp,mv,rm,find,diff,cmp. Standard Input/Output Redirection, File Name Expansion, Changing file Permission using chmod-absolute mode ,symbolic mode. | 7 | 2 |
| | 2.2 | Simple filter commands-head,tail,wc,cut,tr,paste,sort,uniq,wc, sed,awk,pipe.Mathematical commands-expr,factor,bc.Networking commands-mesg, who,talk,write,wall,finger,chfn,ping traceroute,ssh. Process related Commands-ps,top,kill.Disk related commands-df,du | 7 | 2 |
| | 2.3 | File transfer command-ftp.Compressing and decompressing files-compress,gzip,gunzip.Mounting and unmounting filesystem-mount,umount. | 6 | 2 |
| 3 | 3.1 | **Shell Programming**-Creating and editing files with vi and gedit editor. Basics of shell programming, shell programming in bash. | 7 | 3,4 |
| | 3.2 | Shell variables-Local and Global variables, system shell variables, Parameter Handling In Shell script | 3 | 3,4 |

| | | | | |
|---|---|---|---|---|
| | 3.3 | Control Structures- Test Operations, Conditional control structures, Loop control structures. | 5 | 3,4 |
| 4 | 4.1 | Basic System Administration-Superuser Control,-su,sudo,Scheduling task using cron | 3 | 3,4 |
| | 4.2 | Controlling access to directories and files:chmod,changing a file's owner or group:chown and chgrp,Managing Users and Groups: Command line User management- useradd, userdel, usermod, groupadd, groupdel, and groupmod. | 6 | 3,4 |
| | 4.3 | The password Files. Redhat package management using rpm. Analyse various servers-DHCP,DNS,Apache and squid | 6 | 3,4 |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Valuation is internal. | | |

| | |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>Lecture |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 30 Marks**<br>**Written Test / Seminar / Viva/ Assignments** |
| | **B. Semester End examination 70 Marks Time: 2 hours**<br>**Written test** |

**REFERENCES**

1. The Complete reference-Linux, Sixth Edition-TATA McGRAW-HILL Edition
2. Linux Administration-A Beginners Guide,Sixth edition-Wale Soyinka
3. Official Red Hat Linux Users guide by Redhat, Wiley Dreamtech India
4. Graham Glass & King Ables - UNIX for programmers and users, Third Edition, Pearson Education.
5. Neil Mathew & Richard Stones - Beginning Linux Programming, Fourth edition, Wiley Dreamtech India.
6. Cristopher Negus - Red Hat Linux Bible, Wiley Dreamtech India 2005 edition.

# Mahatma Gandhi University
# Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | **BSc (Hons) Cyber Forensics** | | | | | |
| **Course Name** | **DISTRIBUTED SYSTEMS** (Modern Computing with Resource Sharing Specialization) | | | | | |
| **Type of Course** | **DSE** | | | | | |
| **Course Code** | MG4DSECFS202 | | | | | |
| **Course Level** | **200 - 299** | | | | | |
| **Course Summary** | Covers concepts related to designing, implementing and managing distributed computing system | | | | | |
| **Semester** | IV | Credits | | | 4 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 4 | 0 | 0 | | 60 |
| **Pre-requisites, if any** | | | | | | |

**COURSE OUTCOMES (CO)**

| **CO No.** | **Expected Course Outcomes upon completion of this course , the students will be able to:** | **Learning Domains *** | **PO No** |
|---|---|---|---|
| 1 | Familiarize the fundamental concepts of Distributed syste including its characteristics, hardware, and software concepts. | Understand | 1 |
| 2 | Analyse various communication models in Distributed system, which includes Remote procedure calls, remote object invocation, message oriented communication, stream oriented communication | Analyse | 3 |
| 3 | Analyse the reason and technique of code migration | Analyse | 1,3 |
| 4 | Evaluate, how the process can synchronize | Evaluate | 2,4 |

***Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)***

**COURSE CONTENT**

**Content for Classroom transaction (Units)**

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Introduction to Distributed System-definition, characteristics, Hardware Concepts-multiprocessors | 3 | 1 |
| | 1.2 | Homogeneous multi computer systems, Heterogeneous multi computer systems | 4 | 1 |
| | 1.3 | Software concepts-Distributed Operating-Systems, Uniprocessor Operating Systems, multiprocessor Operating systems, multi computer operating systems, DSM, network Operating Systems | 5 | 1 |
| 2 | 2.1 | Ccommunication model - RPC - basic RPC Operation, Client and Server Stubs, parameter passing, Remote Object Invocation-Distributed Objects, binding a client to an Objects, Static and Dynamic RMI | 7 | 1,2 |
| | 2.2 | Message-Oriented Communication-persistent communication, transient communication, Bekerly Sockets, MPI | 6 | 2 |
| | 2.3 | MOM-message-queuing model, messa brockers. Stream-Oriented Communicatic media representation, data stream. | 5 | 2 |
| 3 | 3.1 | Process-threads, thread Implementatic threads in Distributed System, Multithread Clients, multithreaded Servers, | 3 | 1,2 |
| | 3.2 | Clients-user Interface, client-side Software for Distribution Transparency, Servers-general Design Issues, Object Servers, | 4 | 1,2 |
| | 3.3 | Code migration-Approaches to code migration, migration and local resources, migration in heterogeneous systems | 5 | 1,2 |
| 4 | 4.1 | Synchronisation-Clock Synchronisation, Christan's algorithms, Bekerly Algorithm, Logical Clocks-Lamport Timestamps | 5 | 2 |
| | 4.2 | Election algorithms-Bully algorithms, Ring Algorithms, Mutual Exclusion-centralized algorithm, Distributed algorithm,Token Ring Algorithms, | 7 | 2,4 |

| | | | | |
|---|---|---|---|---|
| | 4.3 | Consistency and Replication-reason f replication, Object Replication, Fa Tolerence-basic concepts, failure mode Failure making by Redundancy. | 6 | 4 |
| 5 | 5.1 | Teacher Specific content. This can be eith class room teaching, practical session, fie visit etc as specified by the teacher concerne Evaluation is internal. | | |

| | |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 30 Marks**<br>**Written Test / Seminar / Viva/ Assignments** |
| | **B. Semester End examination 70 Marks Time: 2 hours**<br>**Written test** |

**REFERENCES**

1. Distributed Systems Principles and paradigms- Andrew S Tanenbaum, Marteen van Steen-Prentice Hall Of India-Second Edition
2. Distributed Systems Concepts and Design -George Coulouris, Jean Dollimore, Tim Kindberg-Third Edition
3. Distributed Systems -Sunitha Mahajan, Seema Shah- Oxford University Press, First Edition 2010
4. Distributed Operating System- Pradeep K Sinha-PHI Edition-first Edition
5. Distributed algorithms – Nancy A Lynch. Hardcourt Asia Pvt.Ltd. Morgan Kaufmann,2000

# Mahatma Gandhi University
# Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | **BSc (Hons) Cyber Forensics** | | | | | |
| **Course Name** | **INCIDENT RESPONSE IN CYBER FORENSICS** | | | | | |
| **Type of Course** | DSC B | | | | | |
| **Course Code** | MG4DSCCFS202 | | | | | |
| **Course Level** | **200 -299** | | | | | |
| **Course Summary** | Incident Response is a crucial aspect of cyber security ,which provides a comprehensive approach, covering foundational concepts, hands-on technical skills, and exposure to advanced incident response techniques. | | | | | |
| **Semester** | IV | Credits | | | 4 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 3 | 0 | 1 | | 75 |
| **Pre-requisites, if any** | | | | | | |

## COURSE OUTCOMES (CO)

| CO No. | Expected Course Outcomes upon completion of this course , the students will be able to: | Learning Domains * | PO No |
|---|---|---|---|
| 1 | Understand the phases and steps involved in the incident response process. Grasp the components and structure of an incident response plan. | Understand | 1 |
| 2 | Evaluate the importance of a well-defined incident response plan. Examine the digital forensic process. | Evaluate | 2 |
| 3 | Apply incident response methodologies to real-world scenarios. Develop an incident response playbook based on different attack scenarios. | Apply | 2 |
| 4 | Analyse packet captures as a form of network evidence. Analyse system memory as a form of forensic evidence | Analyse | 2 |
| ***Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)*** | | | |

**COURSE CONTENT**

**Content for Classroom transaction (Units)**

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | The incident response process, The incident response plan, The incident response playbook. | 5 | 1,2 |
| | 1.2 | Forensic<br>Fundamentals: Digital forensic fundamentals, The digital forensic process | 4 | 1 |
| | 1.3 | Acquiring Host-Based<br>Evidence-Preparation, Evidence volatility, Evidence acquisition, Evidence collection procedures,<br>Non-volatile data. | 6 | 1,2 |
| 2 | 2.1 | Network Evidence Collection: Preparation, Network device evidence. | 4 | 2 |
| | 2.2 | Packet capture, Evidence<br>Collection. | 6 | 4 |
| | 2.3 | Network Evidence Analysis-Analyzing packet captures, Analyzing network log files | 5 | 4 |
| 3 | 3.1 | Analyzing System Memory-Memory evidence overview, Memory analysis.. | 6 | 4 |
| | 3.2 | Forensic Reporting- | 3 | 4 |
| | 3.3 | Documentation overview, Incident tracking, Written reports Advanced Incident Response Techniques- Malware analysis and reverse engineering,<br>Threat intelligence and information sharing, Endpoint detection and response (EDR),<br>Advanced persistent threat (APT) detection and response. | 6 | 4 |
| 4 | 4.1 | Digital Forensic Fundamentals-Introduce digital forensic tools and conduct basic exercises on file system | 10 | 3 |

| | | | | |
|---|---|---|---|---|
| | | analysis, file recovery, and metadata examination.<br>Non-volatile Data Analysis Perform analysis on non-volatile data sources, such as disk images. Use tools to extract information, recover deleted files, and understand file structures. | | |
| | 4.2 | Packet Analysis with Wireshark- Analyze packet captures using Wireshark. Explore protocols, extract information, and identify patterns indicative of potential security incidents | 10 | 3 |
| | 4.3 | Analyzing System Memory- Explore memory evidence by capturing and analyzing volatile data. Use tools like Volatility to examine memory dumps and identify malicious activity. | 10 | 3 |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Evaluation is internal. | | |

| | |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture and Practical** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 25 Marks**<br>**Written Test / Seminar / Viva/ Assignments**<br>**Practical 15 Marks** |
| | **B. Semester End examination 50 Marks Time: 1.5 hours**<br>**Written test**<br>**Practical Examination 35 Marks** |

**References**

1. Digital Forensics and Incident Response , Gerard Johansen, 1st edition, Packt Publishing, 2017
2. "Incident Response & Computer Forensics" by Jason T. Luttgens, Matthew Pepe, and Kevin Mandia
3. "Digital Forensics and Incident Response" by Gerard Johansen

# Mahatma Gandhi University
# Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | | | | | | |
| **Course Name** | **PROGRAMMING IN JAVA** | | | | | |
| **Type of Course** | SEC | | | | | |
| **Course Code** | MG4SECCFS200 | | | | | |
| **Course Level** | **200 - 299** | | | | | |
| **Course Summary** | The specific outcomes of a Java course can vary depending on the level (introductory, intermediate, and advanced) and the focus of the course (e.g., Java programming, web development with Java, Java for mobile development). | | | | | |
| **Semester** | IV | Credits | | | 3 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 0 | 3 | 0 | | 45 |
| **Pre-requisites, if any** | | | | | | |

**COURSE OUTCOMES (CO)**

| CO No. | Expected Course Outcomes upon completion of this course , the students will be able to: | Learning Domains * | PO No |
|---|---|---|---|
| 1 | Familiarize its history, features, and core concepts. | Understand | 1 |
| 2 | Analyse exception-resistant code and crafting efficient multi threaded programs. | Analyse | 1,2 |
| 3 | Apply graphics techniques and swing components to create multimedia-rich content. | Apply | 1,2 |
| 4 | Evaluates students' ability to design, implement, and deliver a functional Java application, showcasing their overall proficiency in Java programming. | Evaluate | 1,2,3 |

****Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)***

COURSE CONTENT

**Content for Classroom transaction (Units)**

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Brief History of Java, Feature of Java, JDK, Data Types, Operators, Control Structures inJAVA, | 3 | 1 |
| | 1.2 | Arrays, Defining a Class, Fields declaration, Method declaration, creating object, Accessing | 3 | 1 |
| | 1.3 | Class members, method overloading, visibility control, Constructors, constructor overloading,<br>Super keyword, static members, Inheritance, Overriding Methods. | 3 | 1 |
| 2 | 2.1 | Exception Handling- Try- Catch Statement, Catching more than one Exception, The Finally Clause.Multi-threading | 4 | 1,2 |
| | 2.2 | Creation of multi threaded program, thread Life cycle. | 3 | 1,2 |
| 3 | 3.1 | Applet Fundamentals -applet tag, applet life cycle, Work<br>With graphics - Line, Rectangle, Oval, Arc, and Colour setting. | 3 | 1,2,3 |
| | 3.2 | AWT and Event Handling- Delegation Event Model -Event Classes- Sources of Events-<br>Event Listeners | 3 | 1,2,3 |
| | 3.3 | Swing- components of swing- Jabel, JButton, JCheckBox,<br>JRadioButton, JList, JComboBox, JTextField, JText Area | 3 | 1,2,3 |
| 4 | 4.1 | Part I. Applet, swing based Programs | 10 | 1,2,3 |
| | 4.2 | Part II (using class and read inputs from keyboard)<br>Java Programs: Method Overloading-Method Overriding-inheritance, | 10 | 1,2,3 |

| | | | | |
|---|---|---|---|---|
| | | interfaces, Exception Handling-Multi threading | | |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Evaluation is internal. | | |

| | |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture and Practical** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 25 Marks**<br>**Written Test / Seminar / Viva/ Assignments** |
| | **B. Semester End examination 50 Marks Time: 1.5 hours**<br>**Written test** |

**BOOK OF STUDY:**

1. E. Balagurusamy- Programming with Java, Third Edition, McGraw Hill Companies.
2. K. Somasundaram - PROGRAMMING IN JAVA2, First Edition, Jaico Publishing House.

**REFERENCE:**

1. Patrick Naughton - Java2 the Complete Reference, Seventh Edition:
2. Cay S Horstmann &amp; Gary Cornell - Core Java Volume 1- Fundamentals, Eighth edition.
3. Java 6 Programming Black Book 2007 Edition, Dreamtech press.

# Mahatma Gandhi University
# Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | | | | | | |
| **Course Name** | **CYBER LAWS AND CASE STUDIES** | | | | | |
| **Type of Course** | VAC | | | | | |
| **Course Code** | MG4VACCFS200 | | | | | |
| **Course Level** | **200 -299** | | | | | |
| **Course Summary** | **Cyber Laws typically covers legal frameworks and regulations that govern activities in cyberspace.** | | | | | |
| **Semester** | IV | Credits | | | 3 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 3 | 0 | 0 | | 45 |
| **Pre-requisites, if any** | | | | | | |

COURSE OUTCOMES (CO)

| CO No. | Expected Course Outcomes upon completion of this course , the students will be able to: | Learning Domains * | PO No |
|---|---|---|---|
| 1 | Understand the advantages and importance of Cyber Laws. | Understand | 1 |
| 2 | Evaluate the impact of technology on privacy rights. Examine high-profile cyber-crime cases | Evaluate | 2 |
| 3 | Apply knowledge of E-Governance in a legal context. Apply legal knowledge to analyze case studies on e-commerce disputes. | Apply | 2 |
| 4 | Evaluate the significance of law in the digital age. Assess the significance of Civil Law jurisdiction in India. | Evaluate | 2 |
| ***Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)*** | | | |

**COURSE CONTENT**

**Content for Classroom transaction (Units)**

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Basic of law, Advantages of Cyber Laws, Understanding cyber space, Defining cyber law, Scope and jurisprudence , | 3 | 1 |
| | 1.2 | Concept of jurisprudence, Overview of Indian legal system, Introduction to IT Act 2000,<br>Amendment in IT Act. | 3 | 1,2 |
| | 1.3 | Jurisdiction: Civil Law of Jurisdiction in India, Cause of Action, Jurisdiction and IT Act 2000.Indian<br>Evidence Act Vs IT Act 2000. | 4 | 2 |
| 2 | 2.1 | Digital signature and Electronic signature, Digital Signature under the IT Act, 2000 | 4 | 1,2 |
| | 2.2 | E-Governance,<br>Attribution, Acknowledgement and Dispatch of Electronic Records, Certifying Authorities, Duties of<br>Subscribers, Intermediaries, | 4 | 3 |
| | 2.3 | Electronic Commerce, E-commerce in India, Electronic Contracts.<br>Penalties and offenses under the IT Act, 2000. | 3 | 3 |
| 3 | 3.1 | E-Commerce and Consumer Protection - Legal aspects of electronic transactions, Consumer protection laws online | 3 | 3 |
| | 3.2 | Case studies on e-commerce disputes, Cyber security Laws and Incident Response - Legal frameworks for cyber security | 3 | 3 |
| | 3.3 | Incident response and legal considerations, Case studies on cyber security incidents and legal outcomes | 3 | 3 |
| 4 | 4.1 | Privacy Laws and Regulations- Overview of privacy laws (e.g., GDPR, CCPA), | 5 | 4 |

| | | | | |
|---|---|---|---|---|
| | 4.2 | Case studies on privacy breaches, Impact of technology on privacy rights | 5 | 4 |
| | 4.3 | Cyber crime Laws and Enforcement-Cyber crime legislation and statutes, Law enforcement in cyberspace , Case studies on high-profile cyber crime cases | 5 | 4 |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Evaluation is internal. | | |

| | |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 25 Marks**<br>**Written Test / Seminar / Viva/ Assignments** |
| | **B. Semester End examination 50 Marks Time: 1.5 hours**<br>**Written test** |

**REFERENCES**

1. Cyber Law Crimes, Barkha and U. Rama Mohan, 3rd Edition , Asia Law House, 2017
2. Cyber Laws Simplified, Vivek Sood, 3 rd edition, Mc Graw Hill Education, 2014
3. "Cyber Law: Maximizing Safety and Minimizing Risk in Classrooms" by Virginia Rezmierski
4. "Cybersecurity Law" by Jeff Kosseff

# SEMESTER 5

# Mahatma Gandhi University
# Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | **BSc (Hons) Cyber Forensics** | | | | | |
| **Course Name** | **DATABASE MANAGEMENT SYSTEM AND SECURITY** | | | | | |
| **Type of Course** | DSC A | | | | | |
| **Course Code** | MG5DSCCFS300 | | | | | |
| **Course Level** | **300 - 399** | | | | | |
| **Course Summary** | Aim to understanding of both database management system concepts and principles of security, enabling them to design, implement, and secure databases in real-world scenarios | | | | | |
| **Semester** | V | Credits | | | 4 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 3 | 0 | 1 | 0 | 75 |
| **Pre-requisites, if any** | | | | | | |

**COURSE OUTCOMES (CO)**

| **CO No.** | **Expected Course Outcomes upon completion of this course , the students will be able to:** | **Learning Domains *** | **PO No** |
|---|---|---|---|
| 1 | Familiarise the different data models and effective use of database management systems for data storage and retrieval. | Understand | 1 |
| 2 | Analyse database management concepts, relational data modeling, normalization, and querying databases using SQL and other formal languages. | Analyse | 2 |
| 3 | Apply data security measure to protect sensitive information | Apply | 2 |
| 4 | Create and execute SQL queries for data retrieval, modification, and manipulation. | Create | 3 |
| ***Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)*** | | | |

**COURSE CONTENT**

**Content for Classroom transaction (Units)**

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Introduction: Characteristics of the Database approach,Problems with file system data management | 3 | 1 |
| | 1.2 | Database System Architecture, Levels Data Abstraction,Schema, Instance, Data Independence | 4 | 2 |
| | 1.3 | Evaluate ER Model, Relational Model and Enhanced Entity Relationship | 5 | 3 |
| | 1.4 | Integrity Constraints . | 3 | 1,2 |
| 2 | 2.1 | Physical Data organization, Indexed files, sequential Organization files. | 5 | 1 |
| | 2.2 | The relational Data model concepts ,Relational algebra, Tuple relational calculus, Domain relational calculus, SQL | 5 | 2 |
| | 2.3 | First, Second and Third Normal forms, Boyce – Codd Normal forms. | 5 | 2 |
| 3 | 3.1 | Introduction to Databases Security Problems in Databases | 3 | 1 |
| | 3.2 | Database Integrity and Security Concepts, Domain constraints, Referential Integrity | 3 | 3 |
| | 3.3 | Discretionary access control method, Mandatory access control and role base access control for multilevel security | 4 | 1,2 |
| | 3.4 | Crash Recovery, Failure classification, Recovery concepts, Log base recovery techniques ,Checkpoints, Recovery with concurrent transactions | 5 | 3 |
| 4 | 4.1 | Understanding DDL is used to define the structure of the database, including creating, altering, and deleting tables and schemas.<br>DML is used for managing data within the database, including querying, inserting, updating, and deleting records.<br>DCL is used to control access to data within the database, including granting and revoking permissions. | 10 | 1 |
| | 4.2 | Analyzing in SQL (Aggregate, Sort, Date) | 8 | 2 |

|  |  |  |  |  |
|---|---|---|---|---|
|  | 4.3 | Create PL/SQL Program Using Conditional Statements, Loop Statements, Function, Procedure | 12 | 4 |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Evaluation is internal. |  |  |

|  |  |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture and Practical** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 25 Marks**<br>**Written Test / Seminar / Viva/ Assignments**<br>**Practical 15 Marks** |
|  | **B. Semester End examination 50 Marks Time: 1.5 hours**<br>**Written test**<br>**Practical Examination 35 Marks** |

**Text Books:**

1. Database system concepts,Silberschatz, H.F Korth , and S Sudarsan,, Fouth Edition, 2002 Tata McGraw Hill.
2. Database Security and Auditing, Hassan A. Afyouni, India Edition,2009 cengageLearning.
3. Database Security, SilvanaCastano, Second edition 1994, Pearson Education.
4. Fundmentals of Database Systems, Elmasri and Navathe, 3rd edition, 2003 ,Pearson Education,
5. Database systems- Design Implementation and Management, Peter Rob, Carlos Coronel, 10th edition, 2012, Course Technology

# Mahatma Gandhi University
# Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | **BSc (Hons) Cyber Forensics** | | | | | |
| **Course Name** | **SECURITY ANALYSIS USING PYTHON** | | | | | |
| **Type of Course** | DSC A | | | | | |
| **Course Code** | MG5DSCCFS301 | | | | | |
| **Course Level** | **300 - 399** | | | | | |
| **Course Summary** | Aims should be proficient in using Python for security analysis tasks and be able to apply their knowledge in real-world security scenarios. The course should provide a balance between theoretical concepts and practical hands-on experience | | | | | |
| **Semester** | V | Credits | | | 4 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 3 | 0 | 1 | 0 | 75 |
| **Pre-requisites, if any** | | | | | | |

## COURSE OUTCOMES (CO)

| CO No. | Expected Course Outcomes upon completion of this course , the students will be able to: | Learning Domains * | PO No |
|---|---|---|---|
| 1 | Familiarise Python programming language | Understand | 1, 2 |
| 2 | Examine object oriented concepts in python | Understand | 1, 2 |
| 3 | Reviewing network programming concepts and security modules in Python | Analysis | 1, 2, 4 |
| 4 | Apply Python modules for data and network security | Apply | 1, 2, 4 |
| ****Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)*** | | | |

## COURSE CONTENT

**Content for Classroom transaction (Units)**

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Introduction to Python and installation | 2 | 1 |
|  | 1.2 | variables, expressions, statements, Numeric data types: Int, float, Boolean, string. | 3 | 1 |
|  | 1.3 | Basic data types:List, Tuple, Sets, Dictionaries | 5 | 1 |
| 2 | 2.1 | **Conditionals**: Boolean values and operators, conditional ,Iteration: statements ,break, continue. | 5 | 1 |
|  | 2.2 | **Functions**-Function and its use, pass keyword, flow of execution, parameters and arguments, return values, parameters, local and global scope, function composition, recursion. | 6 | 1 |
|  | 2.3 | **Exception Handling** – Built-in exceptions, Defining new exceptions.<br>**Object Oriented Programming** – Classes and objects, Modules, Packages | 6 | 1 |
| 3 | 3.1 | **Network programming basics** – Socket Programming, Internet Application Programming, FTP lib, http package, smtp lib, urllib. | 7 | 2 |
|  | 3.2 | **Pentesting** – Introducing the scope of pentesting, Approaches to pentesting, Scanning pentesting – using ping sweep | 7 | 2 |
|  | 3.3 | TCP scan concept and its implementation using a Python script, How to create an efficient IP Scanner. | 4 | 2 |
| 4 | 4.1 | Basic programs, Functions and Arrays | 12 | 4 |
|  | 4.2 | Exception handling programs, Implement modules and packages, | 5 | 4 |

| | | | | |
|---|---|---|---|---|
| | 4.3 | Programs with OOPS concept (class, object, inheritance) | 5 | 4 |
| | 4.4 | Socket Programming, Programs using ftp lib, url lib, smtp, Create IP scanner, Port scanner. | 8 | 4 |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Evaluation is internal. | | |

| | |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture and Practical** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 25 Marks**<br>**Written Test / Seminar / Viva/ Assignments**<br>**Practical 15 Marks** |
| | **B. Semester End examination 50 Marks Time: 1.5 hours**<br>**Written test**<br>**Practical Examination 35 Marks** |

**References**

1. An Introduction to Python, Guido van Rossum, Network Theory Ltd. (March 1, 2011)
2. Python Penetration Testing Essentials, Mohit Raj, 2nd Edition, Packt Publishing Ltd, 2015

**SUGGESTED READINGS**

1. Head First Python A Brain Friendly Guide, Paul Barry, O'Reilly Media, Inc., 2010
2. Python Programming – An Introduction to Computer Science, John Zelle, Third Edition, Tom Sumner.

# Mahatma Gandhi University
# Kottayam

<table>
<tr><td><b>Programme</b></td><td colspan="6"><b>BSc (Hons) Cyber Forensics</b></td></tr>
<tr><td><b>Course</b></td><td colspan="6"><b>REMOTE SENSING NETWORK</b> (Network Security Specialization)</td></tr>
<tr><td><b>Type of Course</b></td><td colspan="6">DSE</td></tr>
<tr><td><b>Course Code</b></td><td colspan="6">MG5DSECFS300</td></tr>
<tr><td><b>Course Level</b></td><td colspan="6"><b>300-399</b></td></tr>
<tr><td><b>Course Summary</b></td><td colspan="6">The Remote Sensing Network provides a foundational understanding of remote sensing principles and technologies, learn about various sensors, data interpretation.</td></tr>
<tr><td><b>Semester</b></td><td>V</td><td colspan="3">Credits</td><td>4</td><td rowspan="2">Total Hours</td></tr>
<tr><td rowspan="2"><b>Course Details</b></td><td rowspan="2">Learning Approach</td><td>Lecture</td><td>Tutorial</td><td>Practical</td><td>Others</td></tr>
<tr><td>4</td><td>0</td><td>0</td><td>0</td><td>60</td></tr>
<tr><td><b>Pre-requisites, if any</b></td><td colspan="6"></td></tr>
</table>

## COURSE OUTCOMES (CO)

| CO No. | Expected Course Outcomes upon completion of this course , the students will be able to: | Learning Domains * | PO |
|---|---|---|---|
| 1 | Aware of the principles and concepts of remote sensing. | Understand | 2 |
| 2 | Realize the functioning of various Remote Sensing platforms and sensors | Understand | 2 |
| 3 | Analysing and processing the data from remote sensors. | Analyse | 3,4 |
| 4 | Apply remote sensing techniques to real world problems | Apply | 4,5,6,10 |
| ****Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)*** | | | |

**COURSE CONTENT**

**Content for Classroom transaction (Units)**

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Definitions – Milestones in the history of remote sensing | 4 | 1 |
| | 1.2 | Electromagnetic Radiations – Electromagnetic spectrum – Major divisions of electromagnetic spectrum | 4 | 1 |
| | 1.3 | Radiation Laws – Interactions with the Atmosphere and surfaces | 4 | 1 |
| 2 | 2.1 | Platforms - Type of Platforms - Ground Observation Platform – Airborne Observation Platform and Space-Borne Observation Platform | 4 | 2 |
| | 2.2 | Types of satellites – Earth Resources Satellites – Meteorological Satellites | 4 | 2 |
| | 2.3 | Sensors – classification of sensors – optical – microwave – thermal | 5 | 2 |
| 3 | 3.1 | Visual Image Interpretation (Overview), Digital Image Processing (Overview) | 5 | 3 |
| | 3.2 | Data Integration, Analysis, and Presentation - Multi-Approach of Remote Sensing | 5 | 3 |
| | 3.3 | Integration with Ground Truth and Other Ancillary Data - Integration of Transformed Data - Integration with GIS | 5 | 3 |
| | 3.4 | Process of Remote Sensing Data Analysis - The Level of Detail - Limitations of Remote Sensing Data Analysis – Presentation | 5 | 3 |
| 4 | 4.1 | Land-Cover and Land-Use, Agriculture | 4 | 4 |
| | 4.2 | Forestry , Geology, Geomorphology, Urban Applications | 4 | 4 |
| | 4.3 | Hydrology, Mapping, Oceans and Coastal Monitoring | 4 | 4 |
| | 4.4 | Monitoring of Atmospheric Constituents | 3 | 4 |

|  |  |  |  |  |
|---|---|---|---|---|
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Evaluation is internal. |  |  |

|  |  |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 30 Marks**<br>**Written Test / Seminar / Viva/ Assignments** |
|  | **B. Semester End examination 70 Marks Time: 2 hours**<br>**Written test** |

**REFERENCES**

1. Remote Sensing and GIS, 3rd Edition, BASUDEB BHATTA, Oxford University Press 22 Workspace, 2nd Floor, 1/22 Asaf Ali Road, New Delhi 110002
2. Textbook of Remote Sensing and Geographical Information Systems Third Edition, M. ANJI REDDY, BS Publications
3. Introduction to Remote Sensing, 6th edition, James B campbell, Randolph H. Wyne, Valerie A. Thomas, GuilFord press

**WEBLINK:**

1. http://ecoursesonline.iasri.res.in/mod/page/view.php?id=2059
2. https://lcluc.umd.edu/sites/default/files/lcluc_documents/gutman_lcluc_8-2010_training_0.pdf

# Mahatma Gandhi University Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | **BSc ( Hons) Cyber Forensics** | | | | | |
| **Course** | **INTERNET OF THINGS** (Network Security Specialization) | | | | | |
| **Type of Course** | DSE | | | | | |
| **Course Code** | MG5DSECFS301 | | | | | |
| **Course Level** | **300** | | | | | |
| **Course Summary** | The Internet of Things (IoT) course covers the fundamentals of connecting devices, data collection, and communication protocols. | | | | | |
| **Semester** | V | Credits | | | 4 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 4 | 0 | 0 | 0 | 60 |
| **Pre-requisites, if any** | | | | | | |

## COURSE OUTCOMES (CO)

| CO No. | Expected Course Outcomes upon completion of this course , the students will be able to: | Learning Domains * | PO |
|---|---|---|---|
| 1 | Recognize the basic concept and architecture of IOT | Understand | 1 |
| 2 | Analyse the Networking IOT communication protocol. | Analyse | 1,2 |
| 3 | Analyse the IOT enabling technologies | Analyse | 2 |
| 4 | Evaluate various IOT security aspects | Evaluate | 1,2,3 |
| ****Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)*** | | | |

## COURSE CONTENT

### Content for Classroom transaction (Units)

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| 1 | 1.1 | Understanding IoT | 3 | 1 |
| | 1.2 | IoT Architecture | 6 | 1 |
| | 1.3 | IoT Data Management | 3 | 1 |
| 2 | 2.1 | Networking IoT -Different Layers | 8 | 1,2 |
| | 2.2 | Comparison of M2M and IoT | 5 | 1,2 |
| | 2.3 | IoT System Management | 5 | 1,2 |
| 3 | 3.1 | IoT Physical Devices and Endpoints | 5 | 3 |
| | 3.2 | Programming Framework for IoT | 4 | 3 |
| | 3.3 | Programming Approaches | 3 | 3 |
| 4 | 4.1 | IoT Robustness and Reliability | 5 | 4 |
| | 4.2 | Tools for IoT | 4 | 4 |
| | 4.3 | Case Studies | 9 | 4 |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Valuation is internal. | | |

| | |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 30 Marks**<br>**Written Test / Seminar / Viva/ Assignments** |

|  |  |
|---|---|
|  | **B. Semester End examination 70 Marks Time: 2 hours**<br>**Written test** |

**References**

1. Internet Of Things A HANDS- ON APPROACH by Arshdeep Bahga,Vijay Madisetti,Universities Press(INDIA) PRIVATE LIMITTED
2. Internet of Things: Principles and Paradigms by Rajkumar Buyya
3. https://www.cloudcredential.org/blog/knowledge-byte-building-blocks-of-iot-architecture/
4. https://www.geeksforgeeks.org/introduction-to-internet-of-things-iot-set-1/

# Mahatma Gandhi University
# Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | **BSc (Hons) Cyber Forensics** | | | | | |
| **Course** | **EMBEDDED SYSTEMS** (Network Security Specialization) | | | | | |
| **Type of Course** | DSE | | | | | |
| **Course Code** | MG5DSECFS302 | | | | | |
| **Course Level** | **300-399** | | | | | |
| **Course Summary** | This Embedded Systems course equips students with a comprehensive understanding of embedded systems architecture and components, real-world applications. | | | | | |
| **Semester** | V | Credits | | | 4 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 4 | 0 | 0 | 0 | 60 |
| **Pre-requisites, if any** | | | | | | |

COURSE OUTCOMES (CO)

| CO No. | Expected Course Outcomes upon completion of this course , the students will be able to: | Learning Domains * | PO No |
|---|---|---|---|
| 1 | Familiarize embedded systems architecture and components. | Understand | 2 |
| 2 | Recognize hardware and software interfaces in embedded systems. | Understand | 1,2 |
| 3 | Analyse principles of real-time operating systems in embedded system design. | Analyse | 1,2 |
| 4 | Apply embedded systems for specific applications. | Apply | 2,4,5 |
| ****Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)*** | | | |

**COURSE CONTENT**

**Content for Classroom transaction (Units)**

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Embedded Systems—Definitions - Characteristics of Embedded Systems—Challenges in Designing an Embedded System - Categorization of Embedded Systems - Examples of Embedded Systems | 4 | 1 |
| | 1.2 | Components of Embedded Systems - CISC vs. RISC Processors -General Purpose Processor and DSP Processor | 4 | 1 |
| | 1.3 | Co-design of Hardware and Software - System on Chip - Tools for Embedded Systems | 3 | 1 |
| | 1.4 | Software Life Cycle - Embedded Life Cycle - Modelling of Embedded Systems - Simulation and Emulation - Layers of an Embedded System | 4 | 1 |
| 2 | 2.1 | Communication Protocols in Embedded Systems and types-: Inter System Communication Protocols –RS-232,RS-245 USB, UART, USART | 8 | 2 |
| | 2.2 | Intra System Communication Protocols – I2C, SPI, CAN, | 4 | 2 |
| | 2.3 | Wireless Applications – Bluetooth, Zigbee, Wi-Fi | 3 | 2 |
| 3 | 3.1 | OS service, Process Management, Timer Functions, Event Functions, Memory Management | 4 | 3 |
| | 3.2 | Device, File and I/O subsystem Management, Interrupt routines in RTOS Environment and Handling of interrupts Source Calls | 4 | 3 |
| | 3.3 | Realtime Operating system, Basic design using an RTOS | 4 | 3 |
| | 3.4 | RTOS task scheduling models, Interrupt latency and response of the task as Performance metrics, OS Security Issues. | 3 | 3 |
| 4 | 4.1 | Data compressor - Alarm Clock - Audio player | 5 | 4 |
| | 4.2 | Software modem- Digital still camera - Telephone answering machine | 5 | 4 |

|  |  |  |  |  |
|---|---|---|---|---|
|  | 4.3 | Engine control unit – Video accelerator | 5 | 4 |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Valuation is internal. |  |  |

|  |  |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 30 Marks**<br>**Written Test / Seminar / Viva/ Assignments** |
|  | **B. Semester End examination 70 Marks , Time: 2 hours**<br>**Written test** |

**References**

1. Embedded Systems (Second Edition) D P Kothari, Shriram K Vasudevan, Sundaram R M D, Murali N New Academic Science Limited, 27 Old Gloucester Street, London, WC1N 3AX, UK
2. Embedded Systems Architecture, Programming and Design Second Edition, Raj Kamal, McGraw Hill Education (India) Private Limited, New Delhi
3. An Embedded Software Primer, David E. Simon, Pearson Education, Twelfth Indian Reprint, 2005 Low Price Edition
4. Marilyn Wolf, “Computers as Components - Principles of Embedded Computing System Design”, Third Edition “Morgan Kaufmann Publisher, 2012.

**Weblink:**

https://www.researchgate.net/publication/351999190_An_IoTBased_Smart_Home_Automation_System

# Mahatma Gandhi University

# Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | **BSc (Hons) CYBER FORENSICS** | | | | | |
| **Course Name** | **MOBILE APPLICATION DEVELOPMENT -ANDROID (Operating System Architecture Specialization)** | | | | | |
| **Type of Course** | **DSE** | | | | | |
| **Course Code** | **MG5DSECFS303** | | | | | |
| **Course Level** | **300 - 399** | | | | | |
| **Course Summary** | This course examines the principles of mobile application design and covers the necessary concepts which are required to understand mobile based applications and develop android based applications in particular. | | | | | |
| **Semester** | V | Credits | | | 4 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 4 | 0 | 0 | 0 | 60 |
| | | | | | | |

**COURSE OUTCOMES (CO)**

| **CO No.** | **Expected Course Outcomes upon completion of this course , the students will be able to:** | **Learning Domains *** | | **PO No** |
|---|---|---|---|---|
| 1 | Recognize Android features and architecture | Understand | | 1 |
| 2 | Configure Android environment and development tools | Analyse | | 2 |
| 3 | Use User Interface Components for android application development | Apply | | 2 |
| 4 | Create Android applications using database | Create | | 2 Create |
| | ***Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)** | | | |

## COURSE CONTENT

### Content for Classroom transaction (Units)

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Introduction to Android, Android versions , Android Activity, Android Features and Architecture | 5 | 1 |
|  | 1.2 | Java JDK, Android SDK, android Development Tools, Android Virtual Devices | 5 | 1 |
|  | 1.3 | Emulators, Dalvik Virtual Machine, Layouts -Linear, Absolute, Frame, Relative and Table | 5 | 1 |
| 2 | 2.1 | Android user Interface- Fundamental UI design , User interface with View - Text View | 4 | 3 |
|  | 2.2 | Buttons , Image Button, Edit Text ,Check Box, Toggle Button, Radio Button and Radio Group, Progress Bar | 5 | 2 |
|  | 2.3 | Autocomplete Text View, Spinner, List View, Grid View , Image View, Scroll View, Custom Toast Alert , Time and Date Picker | 6 | 2 |
| 3 | 3.1 | Activity -Introduction, intent, Intent_filter, Activity Life Cycle | 5 | 1 |
|  | 3.2 | Broadcast Life Cycle , Services , Multimedia-Android System Architecture | 6 | 2 |
|  | 3.3 | Play Audio and Video , Test to Speech | 4 | 3 |
| 4 | 4.1 | SQLite Database in Android – Introduction to SQLite Database | 4 | 1 |
|  | 4.2 | Creation and Connection of Database, Extracting values from Cursors, Transactions | 5 | 4 |
|  | 4.3 | Telephoning and Messaging -SMS Telephony, Sending SMS, Receiving SMS, Wi-Fi Activity | 6 | 4 |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Evaluation is internal. |  |  |

| | |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 30 Marks**<br>**Written Test / Seminar / Viva/ Assignments** |
| | **B. Semester End examination 70 Marks Time: 2 hours**<br>**Written test** |

**References**

1. Kevin Grant and Chris Haseman, Beginning Android Programming -Develop and Design , Pearson
2. Pradeep Kothari, Android Application Development, Dreamtech Press ,2014

# Mahatma Gandhi University
# Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | **BSc (Hons) Cyber Forensics** | | | | | |
| **Course** | **SOFT COMPUTING TECHNIQUES** (Modern Computing with Resource Sharing Specialization) | | | | | |
| **Type of Course** | DSE | | | | | |
| **Course Code** | **MG5DSECFS304** | | | | | |
| **Course Level** | **300-399** | | | | | |
| **Course Summary** | This explores Soft Computing, a method for handling imprecise information. It dives into Neural Networks, inspired by the brain, covering their structure, learning, and limitations. Backpropagation Networks, a powerful type of neural network, are examined in detail. Fuzzy Set Theory is introduced, along with Fuzzy Logic for reasoning with uncertain data. Finally, Genetic Algorithms, inspired by evolution, are explored as a problem-solving technique. | | | | | |
| **Semester** | V | Credits | | | 4 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 4 | 0 | 0 | 0 | 60 |
| **Pre-requisites, if any** | | | | | | |

**COURSE OUTCOMES (CO)**

| **CO No.** | **Expected Course Outcomes upon completion of this course , the students will be able to:** | **Learning Domains *** | **PO** |
|---|---|---|---|
| 1 | Understand the core concepts of Soft Computing and Neural Networks, including their differences from traditional computing methods. (This outcome relates to Unit 1) | Understand | 2 |
| 2 | Apply Backpropagation, a powerful neural network learning algorithm, to solve problems. (This outcome relates to Unit 2) | Apply | 2 |

| | | | |
|---|---|---|---|
| 3 | Evaluate Fuzzy Set Theory and Fuzzy Logic to represent and reason with imprecise information. (This outcome relates to Units 3 & 4) | Analyse | 3,4 |
| 4 | Apply Genetic Algorithms, inspired by natural selection, to optimize solutions for complex problems. (This outcome relates to Unit 5) | Apply | 4,5,6,10 |
| ***Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)*** | | | |

**COURSE CONTENT**

**Content for Classroom transaction (Units)**

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Soft Computing and Neural Networks-Soft Computing vs. Hard Computing,Key differences,Advantages of soft computing. | 4 | 1 |
| | 1.2 | The Building Blocks of Neural Networks - Inspiration and Architecture Fundamentals(The Human Brain as Inspiration, The Artificial Neuron Model, Activation Functions-e.g., sigmoid, ReLU) | 4 | 1 |
| | 1.3 | Exploring Neural Network Architectures-Network Design and Information Flow: Neural Network Architectures, Single-layer vs. Multilayer Feedforward Networks, Recurrent Networks, Neural Network Characteristics. | 4 | 1 |
| 2 | 2.1 | Introduction to Artificial Neural Networks and Backpropagation-Perceptron model, Single Layer Artificial Neural Network, Multilayer Perception Model, Backpropagation Learning | 4 | 2 |
| | 2.2 | Building Blocks of Backpropagation-Input layer Propagation,Hidden layer computation,Output layer computation,Calculation of errors. | 4 | 2 |
| | 2.3 | The Backpropagation Algorithm | 5 | 2 |
| 3 | 3.1 | Introduction to Set Theory and Fuzzy Logic-Sets and Their Properties,Crisp sets,Properties and operations of crisp sets | 6 | 3 |

| | | | | |
|---|---|---|---|---|
| | 3.2 | Fuzzy Sets and Membership Functions-Fuzzy Logic and Its Need,Fuzzy sets,Membership functions,Basic fuzzy set operations | 8 | 3 |
| | 3.3 | Properties of Fuzzy Sets and Applications,Properties of Fuzzy Sets, Applications of Fuzzy Sets | 6 | 3 |
| 4 | 4.1 | Classical logic and its limitations-Crisp Logic, Laws of Propositional Logic, Inference in Propositional Logic, Predicate Logic, Interpretations of Predicate Logic Formula, Inference in Predicate Logic, | 4 | 4 |
| | 4.2 | Fuzzy Logic for Representing Uncertainty-<br>Fuzzy Logic vs. Crisp Logic,fuzzy propositions,fuzzy connectives,fuzzy quantifiers | 4 | 4 |
| | 4.3 | Fuzzy Inference and Applications-Fuzzy Inference, Fuzzy Rule Based System, Defuzzification Methods, | 4 | 4 |
| | 4.4 | Applications of Fuzzy Systems | 3 | 4 |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Evaluation is internal. | | |

| | |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**C. Continuous Comprehensive Assessment (CCA) 30 Marks**<br>**Written Test / Seminar / Viva/ Assignments** |
| | **D. Semester End examination 70 Marks, Time: 2 hours**<br>**Written test** |

**REFERENCES**

4. Remote Sensing and GIS, 3rd Edition, BASUDEB BHATTA, Oxford University Press 22 Workspace, 2nd Floor, 1/22 Asaf Ali Road, New Delhi 110002

5. Textbook of Remote Sensing and Geographical Information Systems Third Edition, M. ANJI REDDY, BS Publications
6. Introduction to Remote Sensing, 6th edition, James B campbell, Randolph H. Wyne, Valerie A. Thomas, GuilFord press

**WEBLINK:**

3. http://ecoursesonline.iasri.res.in/mod/page/view.php?id=2059
4. https://lcluc.umd.edu/sites/default/files/lcluc_documents/gutman_lcluc_8-2010_training_0.pdf

# Mahatma Gandhi University

# Kottayam

| | |
|---|---|
| **Programme** | **BSc (Hons) CYBER FORENSICS** |
| **Course Name** | **BIOMETRIC SECURITY** |
| **Type of Course** | **DSE** |
| **Course Code** | MG5DSECFS305 |
| **Course Level** | **300 - 399** |
| **Course Summary** | Aim to create roles in biometric system design, implementation, evaluation, and security analysis, ensuring they have the skills to work in areas where biometrics play a crucial role in authentication and identification. |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Semester** | V | Credits | | | 4 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 4 | 0 | 0 | 0 | 60 |
| | | | | | | |

**COURSE OUTCOMES (CO)**

| **CO No.** | **Expected Course Outcomes upon completion of this course , the students will be able to:** | **Learning Domains *** | | **PO No** |
|---|---|---|---|---|
| 1 | Recognize biometric technologies and fundamentals, and the standards governing their implementation. | Understand | | 1 |
| 2 | Analyse the strengths and weaknesses of each biometric technology by considering factors like accuracy, security, and usability | Analyse | | 2 |
| 3 | Apply concepts to design secure and effective biometric systems. | Apply | | 2 |
| 4 | Evaluate biometric security systems for diverse applications | Evaluate | | 2 |
| | ***Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)*** | | | |

**COURSE CONTENT**

**Content for Classroom transaction (Units)**

| Module | Unit s | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Biometric fundamentals and standards: Definition, Biometrics versus traditional techniques, Characteristics | 4 | 1 |
| | 1.2 | Key biometric processes: Verification - Identification - Biometric matching | 5 | 2 |
| | 1.3 | Performance of biometric systems using metrics like False Acceptance Rate (FAR), False Rejection Rate (FRR), and Equal Error Rate (EER). | 6 | 4 |
| 2 | 2.1 | Physiological Biometric Technologies: Fingerprints ,Technical description, characteristics , Competing technologies ,strengths, weaknesses ,deployment | 5 | 2 |
| | 2.2 | Facial recognition involves capturing and analyzing unique facial features, often using a combination of cameras and image processing algorithms. | 5 | 3 |
| | 2.3 | Iris recognition involves capturing the unique patterns in the iris of the eye, often using near-infrared light. | 5 | 2 |
| 3 | 3.1 | Retina vascular pattern recognition involves capturing and analyzing the unique patterns of blood vessels in the retina. | 4 | 2 |
| | 3.2 | Understanding Hand scanning and analyzing the unique characteristics of an individual's hand, including palm prints and finger geometry. | 4 | 1 |
| | 3.3 | DNA biometrics involves analyzing an individual's unique DNA profile for identification purposes. | 4 | 2 |
| | 3.4 | Analyze Behavioral Biometric Technologies | 3 | 2 |
| 4 | 4.1 | Signature and handwriting technology | 5 | 1 |
| | 4.2 | Keyboard / keystroke dynamics | 5 | 2 |
| | 4.3 | Voice- data acquisition, feature extraction, characteristics, strengths, weaknesses, deployment. | 5 | 4 |

| | | | | |
|---|---|---|---|---|
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Evaluation is internal. | | |

| | |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 30 Marks**<br>**Written Test / Seminar / Viva/ Assignments** |
| | **B. Semester End examination 70 Marks Time: 2 hours**<br>**Written test** |

**References**

1. Biometrics -Identity verification in a network, Samir Nanavathi, Michel Thieme, and Raj Nanavathi, 1st Edition,2002.Wiley Eastern.
2. Implementing Biometric Security,John Chirillo and Scott Blaul, 1st Edition, 2005, Wiley Eastern Publication..
3. Biometrics for Network Security, John Berger, 1st Edition,2004, Prentice Hall.
4. Biometric Technologies and Verification Systems,John R Vacca, 1st Edition, 2007.Elsevier, USA

# Mahatma Gandhi University Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | **BSc (Hons) Cyber Forensics** | | | | | |
| **Course Name** | **MOBILE AND WIRELESS SECURITY** | | | | | |
| **Type of Course** | DSE | | | | | |
| **Course Code** | MG5DSECFS306 | | | | | |
| **Course Level** | **300 -399** | | | | | |
| **Course Summary** | Aim is to equip with the knowledge and skills to secure mobile devices, wireless networks, and applications. | | | | | |
| **Semester** | V | Credits | | | 4 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 4 | 0 | 0 | 0 | 60 |
| **Pre-requisites, if any** | | | | | | |

## COURSE OUTCOMES (CO)

| **CO No.** | **Expected Course Outcomes upon completion of this course , the students will be able to:** | **Learning Domains *** | **PO No** |
|---|---|---|---|
| 1 | Understand Wireless Programming and WEP Security. | Understand | 1 |
| 2 | Apply security principles, including authentication, access control, authorization, non-repudiation, privacy, confidentiality, integrity, and auditing, in wireless networks. | Apply | 2,3 |
| 3 | Analyse the physical layer and media access frame format of IEEE 802.11. Evaluate the weaknesses in WEP and conduct WEP decryption using scripts. | Analyse | 2,3 |
| 4 | Analyse the case studies of global mobile satellite systems and wireless enterprise networks. | Analyse | 1,2,4 |

***Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)***

**COURSE CONTENT**

**Content for Classroom transaction (Units)**

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Wireless Fundamentals: Wireless Hardware, Wireless Network Protocols, Wireless Programming WEP Security. | 5 | 1 |
| | 1.2 | Wireless Cellular Technologies, concepts, Wireless reality, Security essentials, Information classification standards, | 5 | 1 |
| | 1.3 | Wireless Threats: Cracking WEP , Hacking Techniques, Wireless Attacks, Airborne Viruses. | 5 | 1 |
| 2 | 2.1 | Standards and Policy Solutions, Network Solutions, Software Solutions, | 3 | 2 |
| | 2.2 | Physical Hardware Security, Wireless Security. Securing WLAN ,Virtual Private Networks , | 4 | 2 |
| | 2.3 | Intrusion Detection System, Wireless Public Key infrastructure | 3 | 2 |
| | 2.4 | Security Principles, Authentication, Access control and Authorization, | 3 | 2 |
| | 2.5 | Non-repudiation, privacy and Confidentiality, Integrity and Auditing, Security analysis process. | 4 | 2 |
| | 2.6 | Attacks and vulnerabilities, Analyze mitigation and protection. | 3 | 2 |
| 3 | 3.1 | WLAN Configuration, IEEE 802.11 | 2 | 3 |
| | 3.2 | Physical layer, media access frame format | 2 | 3 |
| | 3.3 | systematic exploitation of 802.11b WLAN | 2 | 3 |
| | 3.4 | WEP ,WEP Decryption script. | 2 | 3 |
| | 3.5 | overview of WEP attack , Implementation , Analyses of WEP attacks. | 2 | 3 |

| | | | | |
|---|---|---|---|---|
| 4 | 4.1 | Global Mobile Satellite Systems;, | 3 | 4 |
| | 4.2 | Wireless Enterprise Networks: | 3 | 4 |
| | 4.3 | Introduction to Virtual Networks, Blue tooth technology, Blue tooth Protocols. | 3 | 4 |
| | 4.4 | Pervasive web application architecture | 3 | 4 |
| | 4.5 | Device independent example application | 3 | 4 |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Evaluation is internal. | | |

| | |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction): Summative Assessment**<br>**Lecture** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 30 Marks**<br>**Written Test / Seminar / Viva/ Assignments** |
| | **B. Semester End examination 70 Marks Time: 2 hours**<br>**Written test** |

**References**

1. Wireless Security Essentials: Defending Mobile from Data Piracy, Russel Dean Vines ,First Edition, 2002, John Wiley & Sons,.
2. Maximum Wireless Security, Cyrus, Peikari and Seth Fogie,2002, SAMS Publishing.
3. Wireless and Mobile Networks Architectures,Yi-Bing Lin and Imrich Chlamtac,2001, John Wiley & Sons.
4. Mobile and Personal Communication systems and services, Raj Pandya, 2001, Prentice Hall of India..
5. Wireless Security and Privacy- Best Practices and Design Techniques, Tara Swaminathan and Charles R. Eldon, 2002, Addison Wesley.

# Mahatma Gandhi University
# Kottayam

|  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|
| **Programme** | **BSc (Hons) CYBER FORENSICS** |  |  |  |  |  |
| **Course Name** | **CRITICAL INFRASTRUCTURE SECURITY AND FORENSICS** |  |  |  |  |  |
| **Type of Course** | **DSE** |  |  |  |  |  |
| **Course Code** | MG5DSECFS307 |  |  |  |  |  |
| **Course Level** | **300 – 399** |  |  |  |  |  |
| **Course Summary** | Aim to Provide critical infrastructure security, cybersecurity incident response, and digital forensics within the context of safeguarding essential services and systems. |  |  |  |  |  |
| **Semester** | V | Credits |  |  | 4 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others |  |
|  |  | 4 | 0 | 0 | 0 | 60 |

## COURSE OUTCOMES (CO)

| CO No. | Expected Course Outcomes upon completion of this course , the students will be able to: | Learning Domains * | PO No |
|---|---|---|---|
| 1 | Recognize the potential impact of cyber incidents and ability to assess vulnerabilities in critical infrastructure | Understand (U) | 1 |
| 2 | Analyse existing policy frameworks and their impact on risk management. | Analyse(An) | 2 |
| 3 | Analyse the vulnerabilities of critical infrastructure to natural disasters. | Analyse(An) | 2 |
| 4 | Evaluate the potential impact of physical security threats on critical assets and infrastructure. | Evaluate(E) | 2 |

## COURSE CONTENT

### Content for Classroom transaction (Units)

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|

|  |  |  |  |  |
|---|---|---|---|---|
| 1 | 1.1 | Critical Infrastructure Protection and Cyber Crime | 5 | 1 |
|  | 1.2 | Scientific and Technological Nature of Critical Infrastructure Vulnerabilities | 5 | 3 |
|  | 1.3 | Internet Infrastructure Attacks | 5 | 4 |
| 2 | 2.1 | Critical infrastructure risk management framework. | 5 | 1 |
|  | 2.2 | Quantitative and qualitative risk assessment methods | 3 | 2 |
|  | 2.3 | Establishing specific security objectives for critical infrastructure | 3 | 2 |
|  | 2.4 | Vulnerabilities and threats to critical infrastructure assets | 4 | 4 |
| 3 | 3.1 | Critical infrastructure risk and national preparedness | 3 | 1 |
|  | 3.2 | Law Enforcement and Crime Prevention | 4 | 2 |
|  | 3.3 | Terrorism and its threat to critical infrastructure | 3 | 1 |
|  | 3.4 | Infrastructure Development and Future Challenges | 5 | 4 |
| 4 | 4.1 | Understanding the scope and importance of Physical Security | 5 | 1 |
|  | 4.2 | Physical Security Prevention and Mitigation | 5 | 2 |
|  | 4.3 | Threat Assessment, Planning, and Implementation | 5 | 1 |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned. Evaluation is internal. |  |  |

|  |  |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture** |

| | |
|---|---|
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 30 Marks**<br>**Written Test / Seminar / Viva/ Assignments** |
| | **B. Semester End examination 70 Marks Time: 2 hours**<br>**Written test** |

**Text Books**

1. Homeland Security and Critical Infrastructure Protection, Collins, Pamela A and Ryan K. Baggett, 1st Edition,2009, Praeger Security International
2. Cyber security and IT infrastructure protection, John R Vacca, 1st Edition,2013, Syngress

# Mahatma Gandhi University
# Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | **BSc (Hons) Cyber Forensics** | | | | | |
| **Course Name** | **SECURITY THREATS AND VULNERABILITIES** | | | | | |
| **Type of Course** | DSE | | | | | |
| **Course Code** | MG5DSECFS308 | | | | | |
| **Course Level** | **300 - 399** | | | | | |
| **Course Summary** | Able to assess address and mitigate security threats and vulnerabilities effectively contributing to the overall security posture of an organization | | | | | |
| **Semester** | V | Credits | | | 4 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 4 | 0 | 0 | 0 | 60 |
| **Pre-requisites, if any** | | | | | | |

**COURSE OUTCOMES (CO)**

| CO No. | Expected Course Outcomes upon completion of this course , the students will be able to: | Learning Domains * | PO No |
|---|---|---|---|
| 1 | Recall and list internal and physical security threats, email threats, vulnerabilities in e-commerce, and hacking techniques in wired and wireless networks | Understand | 1 |
| 2 | Analyze the impact of wireless threats and attacks, including WEP cracking, denial of service attacks, network attacks, fault attacks, and side-channel attacks. | Analyse | 2 |
| 3 | Apply knowledge of threats and vulnerabilities to assess and identify potential risks in different computing environments. | Apply | 2,3 |
| 4 | Evaluate the effectiveness of existing security measures in mitigating various threats and attacks. | Evaluate | 2,3, 8 |

**Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)***

## COURSE CONTENT

### Content for Classroom transaction (Units)

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Threats and Vulnerabilities to Information and Computing Infrastructures: Internal Security Threats, Physical Security Threats. | 3 | 1 |
| | 1.2 | E-Mail Threats and Vulnerabilities, E-Commerce Vulnerabilities, | 4 | 1 |
| | 1.3 | Hacking Techniques in Wired Networks , Hacking Techniques in Wireless Networks. | 3 | 2 |
| | 1.4 | Wireless Threats and Attacks: Wireless Threats and Attacks, Cracking WEP, Denial of Service Attacks, Network Attacks, Fault Attacks, Side-Channel Attacks | 5 | 3 |
| 2 | 2.1 | Prevention: Cryptographic Privacy Protection Techniques, ,Protecting Web Sites, | 4 | 1 |
| | 2.2 | Cryptographic Hardware Security Modules, Client-Side Security, Server-Side Security, Database Security, | 5 | 2 |
| | 2.3 | Access Control: Principles and Solutions, Password Authentication ,Computer and Network Authentication, Antivirus Technology, | 6 | 2,3,4 |
| 3 | 3.1 | Detection and Recovery: Intrusion Detection Systems Basics, Host-Based Intrusion Detection Systems , Network-Based Intrusion Detection Systems, | 4 | 1 |
| | 3.2 | Use of Agent Technology for Intrusion Detection, | 1 | 3 |
| | 3.3 | Contingency Planning Management, Computer Security Incident Response Teams (CSIRTs) , | 4 | 4 |
| | 3.4 | Implementing a Security Awareness Program, Risk Assessment for Risk Management, | 4 | 2 |

|  |  |  |  |  |
|---|---|---|---|---|
|  | 3.5 | Security Insurance and Best Practices. | 2 | 4 |
| 4 | 4.1 | Auditing Information Systems Security, Evidence Collection and Analysis Tools, | 4 | 1 |
|  | 4.2 | Information Leakage: Detection and Countermeasures. | 3 | 3 |
|  | 4.3 | Management and Policy Considerations: Digital Rights Management, Web Hosting, | 4 | 2 |
|  | 4.4 | Multilevel Security, Multilevel Security Models, Guidelines for a Comprehensive Security System. | 4 | 4 |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Evaluation is internal. |  |  |

|  |  |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 30 Marks**<br>**Written Test / Seminar / Viva/ Assignments** |
|  | **B. Semester End examination 70 Marks**<br>**Written test** |

## References

1. Information Security, Volume 3, Threats, Vulnerabilities, Prevention, Detection, and Management, Hossein Bidgoli, 2006, Wiley.
2. Loss Prevention and Crime Prevention ,Lawrence J Fennelly, fourth edition, 2004, Elsevier.
3. Information Security Management Handbook, Harold F. Tipton, Sixth Edition,2010, Auerbach publications.

# Mahatma Gandhi University
# Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | **BSc (Hons)Cyber Forensics** | | | | | |
| **Course Name** | **CYBER SECURITY AUDIT AND COMPLIANCE** | | | | | |
| **Type of Course** | DSE | | | | | |
| **Course Code** | MG5DSECFS309 | | | | | |
| **Course Level** | **300 -399** | | | | | |
| **Course Summary** | This course on "Cyber Security Audit and Compliance" equips participants to apply compliance frameworks, evaluate audit findings, understand foundational audit concepts, and analyze various tools and techniques. Participants will gain practical knowledge to improve cyber security measures through effective reporting, incident response, and continuous enhancement strategies. | | | | | |
| **Semester** | V | Credits | | | 4 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 4 | 0 | 0 | 0 | 60 |
| **Pre-requisites, if any** | A basic understanding of information technology and familiarity with foundational concepts of cyber security would be beneficial for participants aiming to grasp the nuances of this course effectively | | | | | |

**COURSE OUTCOMES (CO)**

| CO No. | Expected Course Outcomes upon completion of this course , the students will be able to: | Learning Domains * | PO No |
|---|---|---|---|
| 1 | Familiarise  the fundamental concepts, objectives, and importance of cyber security audits, along with various types and scopes of audits. | Understand | 1 |
| 2 | Apply knowledge of diverse compliance frameworks like GDPR, ISO, HIPAA, and Indian regulations to implement effective controls for ensuring compliance in different organizational contexts. | Apply | 1,2 |
| 3 | Analyse different audit methodologies, risk assessment techniques, and tools used in cyber security audits to assess vulnerabilities and risks comprehensively. | Analyse | 1,2,6 |

|  |  |  |  |
|---|---|---|---|
| 4 | Develop continuous improvement strategies, and assess incident response plans post-audit to enhance overall cyber security measures. | Skill | 2,6 |

***Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)***

## COURSE CONTENT

### Content for Classroom transaction (Units)

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Foundations of Cyber Security Audit: Introduction to Cyber Security Audit. | 3 | 1 |
|  | 1.2 | Objectives and Importance of Auditing. | 3 | 1 |
|  | 1.3 | Types and Scope of Cyber Security Audits | 4 | 1 |
| 2 | 2.1 | Regulatory Compliance and Standards: Understanding Compliance Frameworks -GDPR, ISO, HIPAA | 7 | 2 |
|  | 2.2 | Indian Regulatory Compliance Requirements | 6 | 2 |
|  | 2.3 | Implementing Controls for Compliance | 7 | 2 |
| 3 | 3.1 | Auditing Techniques and Tools: Audit Methodologies and Techniques | 5 | 3 |
|  | 3.2 | Risk Assessment and Management in Auditing | 5 | 3 |
|  | 3.3 | Utilizing Tools for Cyber Security Audits | 5 | 3 |
| 4 | 4.1 | Reporting, Improvement, and Incident Response: Reporting and Documentation in Cyber Security Audits | 5 | 4 |
|  | 4.2 | Continuous Improvement Strategies | 5 | 4 |
|  | 4.3 | Incident Response and Post-Audit Actions | 5 | 4 |

| | | | | |
|---|---|---|---|---|
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned. Evaluation is internal. | | |

| | |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 30 Marks**<br>**Written Test / Seminar / Viva/ Assignments** |
| | **B. Semester End examination 70 Marks Time: 2 hours**<br>**Written test** |

**References**

1. "Cyber Security Essentials" by Rick Howard
2. "IT Auditing and Application Controls for Small and Mid-Sized Enterprises: Revenue, Expenditure, Inventory, Payroll, and More" by Jason Wood
3. "IT Auditing: Using Controls to Protect Information Assets" by Chris Davis and Mike Schiller
4. "The Basics of Cyber Safety: Computer and Mobile Device Safety Made Easy" by John Sammons

# Mahatma Gandhi University
# Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | **BSc (Hons)Cyber Forensics** | | | | | |
| **Course Name** | **M-COMMERCE SECURITY** | | | | | |
| **Type of Course** | DSE | | | | | |
| **Course Code** | MG5DSECFS310 | | | | | |
| **Course Level** | **300 - 399** | | | | | |
| **Course Summary** | Exploring secure payment methods, encryption, authentication and protecting against mobile specific threads | | | | | |
| **Semester** | V | Credits | | | 4 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 4 | 0 | 0 | 0 | 60 |
| **Pre-requisites, if any** | | | | | | |

**COURSE OUTCOMES (CO)**

| **CO No.** | **Expected Course Outcomes upon completion of this course , the students will be able to:** | **Learning Domains *** | **PO No** |
|---|---|---|---|
| 1 | Familiarize the M-Commerce, Payment and security aspects of M-Commerce | Understand | 1 |
| 2 | Understand authentication and authorization methods in M-commerce | Understand | 1 |
| 3 | Learn architecture, models and security of mobile payment systems | Understand | 1,2 |
| 4 | Analyse security threats& vulnerabilities in M-Commerce | Analyse | 2,4 |
| ***Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)** | | | |

## COURSE CONTENT

### Content for Classroom transaction (Units)

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Overview of M-Commerce and its security-Introduction to M-Commerce,structure of M-commerce,different types of M-commerce transactions,Security challenges in M-Commerce. | 3 | 1 |
|  | 1.2 | Payment Technologies in M-Commerce-Overview of mobile payment systems,NFC (Near Field Communication) security,QR code-based payments,Biometric authentication in mobile payments | 6 | 1 |
|  | 1.3 | Legal and regulatory aspects of M-Commerce security-Legal aspects-Information Technology Act, 2000 (IT Act),Data Protection Laws,Electronic Commerce Laws,PCI DSS,Consumer Protection Laws.Key Regulatory Agencies- MeitY, RBI,IT Department,CERT-In,NCIIPC | 6 | 1 |
| 2 | 2.1 | Importance of Authentication and Authorization in M-commerce | 5 | 2 |
|  | 2.2 | Authentication Methods in M-commerce-Passwords,Multi-Factor Authentication (MFA),Biometric Authentication. | 5 | 2 |
|  | 2.3 | Authorization Methods in M-commerce-Role-Based Access Control (RBAC),Attribute-Based Access Control (ABAC),Policy-Based Access Control (PBAC) | 5 | 2 |
| 3 | 3.1 | Architecture and models for mobile payment systems- Mobile Payment System Architecture , Analysis of mobile payment security architecture , Classification of mobile payment models | 5 | 3 |
|  | 3.2 | Security in Mobile payment systems-Security requirements-Confidentiality , Integrity , Availability ,Authorization ,Non repudiation. Layers of security in M-commerce -Device security,Language security ,Wireless security. | 5 | 3 |

|  |  |  |  |  |
|---|---|---|---|---|
|  | 3.3 | Basic concepts in Cryptography - SSL,Symmetric cryptography,Public key Cryptography,elliptic curve cryptography,Self certified public keys. | 5 | 3 |
| 4 | 4.1 | Common Threats in M-Commerce-Phishing,malware,Man-in-the-Middle (MITM) attacks,social engineering,weak Authentication | 6 | 4 |
|  | 4.2 | Vulnerabilities in M-Commerce-Insecure Data Storage,Injection Attacks,Insecure Input Validation,Insecure Communication Channels,Insecure Direct Object References etc. | 6 | 4 |
|  | 4.3 | Security protection solutions | 3 | 4 |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Evaluation is internal. |  |  |

|  |  |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 30 Marks**<br>**Written Test / Seminar / Viva/ Assignments** |
|  | **B. Semester End examination 70 Marks Time: 2 hours**<br>**Written test** |

## Text Books :

1. ”Mobile commerce” by Bandyopadhyay, Karabi.
2. **"Securing Transactions and Payment Systems for M-Commerce"** by Sushila Madan and Jyoti Batra Arora.
3. “Mobile Payment Systems - Secure Network Architectures and Protocols”-Jesus Tellez,Sherali Zeadally
4. "Cryptography and Network Security: Principles and Practice" by William Stallings.
5. https://www.academia.edu/67307531/Security_Measures_in_Mobile_Commerce_Problems_and_Solutions(Security requirements and layers of security).
6. https://concordia.ab.ca/wp-content/uploads/2017/04/OlanrewajuT.pdf.(Mobile Payment System Architecture , Analysis of mobile payment security architecture).
7. "Mobile Commerce Security: A Beginner's Guide" by Kapil Raina, Harsh Harsh.

# Mahatma Gandhi University
# Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | **BSc (Hons) Cyber Forensics** | | | | | |
| **Course Name** | **CYBER WARFARE** | | | | | |
| **Type of Course** | SEC | | | | | |
| **Course Code** | MG5SECCFS300 | | | | | |
| **Course Level** | **300 – 399** | | | | | |
| **Course Summary** | This syllabus is designed to provide a holistic understanding of cyberwarfare, from its foundational concepts to emerging trends, emphasizing critical analysis and strategic thinking in addressing cyber threats. | | | | | |
| **Semester** | V | Credits | | | 3 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 3 | 0 | 0 | 0 | 45 |
| **Pre-requisites, if any** | | | | | | |

## COURSE OUTCOMES (CO)

| CO No. | Expected Course Outcomes upon completion of this course , the students will be able to: | Learning Domains * | PO No |
|---|---|---|---|
| 1 | Recognize the fundamental concepts and definitions of cyberwarfare | Understand (U) | 1 |
| 2 | Analyse the characteristics and evolution of cyberwarfare., | Analyse (An) | 2 |
| 3 | Evaluate the relevance of traditional warfare concepts in the cyber domain | Evaluate(E) | 2 |
| 4 | Apply /Develop a conceptual framework that incorporates both traditional and cyber warfare elements., | Apply (A) | 2 |
| ***Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)*** | | | |

COURSE CONTENT

**Content for Classroom transaction (Units)**

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Information as a Military Asset : What Is Cyberwarfare? The Evolving Nature of War | 2 | 1 |
| | 1.2 | Domains of Warfare ,Exploring the Cyber Domain | 2 | 2 |
| | 1.3 | Information Operations Techniques | 2 | 3 |
| 2 | 2.1 | Intelligence Operations in a Connected World : Intelligence Operations ,The Intelligence Cycle | 3 | 2 |
| | 2.2 | Planning and Direction , Collection , Processing and Exploitation | 3 | 3,4 |
| | 2.3 | Analysis and Production , Dissemination , Intelligence Disciplines , Intelligence Support to Cyberwarfare | 4 | 2 |
| | 2.4 | The Evolving Threat: From Script Kiddies to Advanced Attackers: The Changing Threat Model , Inside the Advanced Persistent Threat , The Cyber Kill Chain. | 4 | 3 |
| 3 | 3.1 | Social Engineering and Cyberwarfare: Humans: The Weak Link | 5 | 1 |
| | 3.2 | Social Engineering , Influence as a Weapon, Tools of the Social Engineer , Defending Against Social Engineering | 5 | 2,3,4 |
| | 3.3 | Cryptography and Cyberwar: An Introduction to Cryptography, Cryptography in Cyberwar, Attacking Cryptography, Defeating Attacks on Cryptographic Systems | 4 | 2,3,4 |
| 4 | 4.1 | The Future of Cyberwarfare<br>Pandora's Box: The Future of Cyberwarfare ,The Future of | 4 | 2 |

| | | | | |
|---|---|---|---|---|
| | | Cyberwar , Blurred Boundaries: Cyberwar and Nonstate Actors | | |
| | 4.2 | International Law and Cyberwarfare , Networks Everywhere: Cyberwar in a Highly Connected World | 4 | 3 |
| | 4.3 | Cyberwar and Infrastructure , Advanced Tools and Training. The Future of Defensive Cyberwar | 3 | 4 |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Valuation is internal. | | |

| | |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 25 Marks**<br>**Written Test / Seminar / Viva/ Assignments** |
| | **B. Semester End examination 50 Marks Time: 1.5 hours**<br>**Written test** |

## References

1. Cyberwarfare: Information Operations in a Connected World 2nd Edition by Mike Chapple, David Seidl, Publisher(s): Jones & Bartlett Learning.
2. "Cyber War: The Next Threat to National Security and What to Do About It" by Richard A. Clarke and Robert K. Knake
3. Cybersecurity and Cyberwar: What Everyone Needs to Know" by P.W. Singer and Allan Friedman
4. Inside Cyber Warfare, 2nd Edition By Jeffrey Carr Released December 2011 Publisher(S): O'Reilly Media, Inc.ISBN: 9781449325459

## SUGGESTED READINGS

1. "Dark Territory: The Secret History of Cyber War" by Fred Kaplan

# SEMESTER 6

# Mahatma Gandhi University
# Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | **BSc (Hons) Cyber Forensics** | | | | | |
| **Course Name** | **PRESERVING AND RECOVERING DIGITAL EVIDENCE** | | | | | |
| **Type of Course** | DSC A | | | | | |
| **Course Code** | MG6DSCCFS300 | | | | | |
| **Course Level** | **300 - 399** | | | | | |
| **Course Summary** | This program explores digital investigation, covering digital evidence, computer crime, network fundamentals, forensic application to networks, and investigating computer crime, culminating in guidelines for handling digital crime scenes and examining evidence, emphasizing ethical consideration. | | | | | |
| **Semester** | VI | Credits | | | 4 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 3 | 0 | 1 | 0 | 75 |
| **Pre-requisites, if any** | | | | | | |

**COURSE OUTCOMES (CO)**

| CO No. | Expected Course Outcomes upon completion of this course , the students will be able to: | Learning Domains * | PO No |
|---|---|---|---|
| 1 | Realize the digital evidence and computer crime. | Understand | 1,2 |
| 2 | Study, how forensic science is applied to networks. | Analyse | 1,2 |
| 3 | Evaluate digital evidence's role as an alibi in computer crime investigations. | Evaluate | 2,3 |
| 4 | Apply guidelines for handling the digital crime scene.<br>. | Apply | 2 |

***Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)***

**COURSE CONTENT**

**Content for Classroom transaction (Units)**

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Digital Investigation: Digital evidence and computer crime. the investigate process, investigate reconstruction, modus operandi, motive and technology ,digital evidence in the court room | 3 | 1 |
| | 1.2 | History and terminals of computer crime investigation, technology and law, | 4 | 1 |
| | 1.3 | The investigate process, investigate reconstruction, modus operandi, motive and technology ,digital evidence in the court room | 4 | 1 |
| 2 | 2.1 | Networks: Networks basics for digital investigators,. | 3 | 2 |
| | 2.2 | Applying forensic science to networks, | 3 | 2 |
| | 2.3 | Digital evidence on physical and data link layers | 3 | 2 |
| | 2.4 | Digital evidence on network and transport layers, | 3 | 2 |
| | 2.5 | Digital evidence on the internet | 3 | 2 |
| 3 | 3.1 | Investigating Computer Crime: Investigating computer intrusions, | 4 | 3 |
| | 3.2 | Iinvestigating cyberstalking, | 3 | 3 |
| | 3.3 | Digital evidence as alibi. | 4 | 3 |
| | 3.4 | Guidelines: Handling the digital crime scene | 4 | 4 |
| | 3.5 | Digital evidence examination guidelines | 4 | 4 |
| 4 | 4.1 | Data Carving | 10 | 4 |
| | 4.2 | Recover data from a formatted hard drive using Disk Drill | 10 | 4 |
| | 4.3 | Recover data from a formatted hard disk with Backup | 10 | 4 |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Evaluation is internal. | | |

| | |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture and practical** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 25 Marks**<br>**Written Test / Seminar / Viva/ Assignments**<br>**Practical 15 Marks** |
| | **B. Semester End examination 50 Marks Time: 1.5 hours**<br>**Written test**<br>**Practical Examination 35 Marks** |

## References

1. Digital Evidence and Computer Crime Forensic science, Computers and Internet, Eoghan Casey,Second Edition, 2011 ,Elsevier Academic Press.
2. A Electronic Discovery and Digital Evidence in a Nut Shell-Daniel J Capra,Shira A scheindlin,-Third Edition, 2009 The Sedona Conerence-Academic Press.
3. he Best Damn Cybercrime and Digital Forensics Book Perio,Jack Wiles, Anthony Reyes ,Jesse Varsalone,2007 Syngress Publishing.
4. Computer Evidence and Computer Crime: Forensic Science, Computers, and the Internet.Casey, Eoghan, 2000 , Cambridge University Press

# Mahatma Gandhi University
# Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | **BSc (Hons) Cyber Forensics** | | | | | |
| **Course Name** | **KALI LINUX** | | | | | |
| **Type of Course** | DSC A | | | | | |
| **Course Code** | MG6DSCCFS301 | | | | | |
| **Course Level** | **300 - 399** | | | | | |
| **Course Summary** | Concepts and programming techniques in Kali Linux. | | | | | |
| **Semester** | VI | Credits | | | 4 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 3 | 0 | 1 | 0 | 75 |
| **Pre-requisites, if any** | | | | | | |

COURSE OUTCOMES (CO)

| **CO No.** | **Expected Course Outcomes upon completion of this course , the students will be able to:** | **Learning Domains *** | **PO No** |
|---|---|---|---|
| 1 | Understand in the basic concepts of kali linux , polices and its applications | Understand | 1 |
| 2 | Familiarise various types of attacks in internet and apply various tools in Kali linux | Apply | 2 |
| 3 | Analyse Security policy , security Measures, Nmap. | Analyse | 1,2 |
| 4 | Evaluate and apply best security practices to mitigate potential risks. | Evaluate | 2,3 |
| ***Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)*** | | | |

COURSE CONTENT

**Content for Classroom transaction (Units)**

| **Module** | **Units** | **Course description** | **Hrs** | **CO No.** |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| 1 | 1.1 | Introduction to Kali: Linux-Features of Kali Linux ,Kali Linux Policies, Applications of Kali Linux, Booting a Kali ISO image in Live mode-On a real computer, In a virtual computer | 6 | 1 |
| | 1.2 | Basic commands-history ,free,sort,more,less,whoami,pwd,cd,mkdir,users,uptime,uname,rm,mv,cp,cat. | 4 | 1 |
| | 1.3 | User account managing commands- adduser, passwd,chfn ,chsh ,chage, Disabling account, Managing groups. | 5 | 1 |
| 2 | 2.1 | Introduction to security assessments- Kali Linux in assessment, Types of assessment, formalization of assessment, Types of attacks-Denial of service, Memory corruption, web vulnerabilities, password attacks, client side attacks. | 7 | 1,2 |
| | 2.2 | Kali Linux tools: Information gathering tools-netcraft,whois,shodan,multego,wayback; Discovering and scanning tools-AngryIPscanner,superscan,Nessus, Portscanning | 4 | 1,2 |
| | 2.3 | Vulnerability assessment tools-Burpsuit,Openvas,Netsparker,Aircrack; Exploitation tools-Metaspoit,BeEF; Social Engineering toolkit-Zfisher,BlackEye | 4 | 2 |
| 3 | 3.1 | Securing and monitoring Kali Linux- Defining a security policy, possible security measures | 4 | 3 |
| | 3.2 | Securing network service, Firewall, monitoring and logging. | 4 | 3 |
| | 3.3 | Nmap-Syntax for scanning a single IP, single Port, Range of Port,100 Most common ports, scanning a Host. A range of IP S | 7 | 3 |
| 4 | 4.1 | Installing Kali Linux, Configuring Kali Linux- On the desktop with network manager, On the command | 10 | 4 |

|  |  |  |  |  |
|---|---|---|---|---|
|  |  | line with ifupdown, On the command line with system-network |  |  |
|  | 4.2 | Downloading a Kali ISO image, Booting a kali ISO image in live mode | 10 | 4 |
|  | 4.3 | Nmap basic commands with options, Evil-limiter basic commands with options, Network analysis using Wireshark. | 10 | 4 |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned. Evaluation is internal. |  |  |

|  |  |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture and Practical** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A.Continuous Comprehensive Assessment (CCA) 25 Marks**<br>**Written Test / Seminar / Viva/ Assignments**<br>**Practical 15 Marks** |
|  | **C. Semester End examination 50 Marks Time: 1.5 hours**<br>**Written test**<br>**Practical Examination 35 Marks** |

## REFERENCES

1. Kali Linux Revealed Mastering the Penetration Testing Distribution by Raphaël Hertzog, Jim O'Gorman, and Mati Aharoni
2. Tools: https://www.javatpoint.com/kali-linux-information-gathering-tools
3. Nmap Commands: https://www.javatpoint.com/nmap-commands-in-kali-linux
4. The Complete reference-Linux, Sixth Edition-TATA McGRAW-HILL Edition
5. Linux Administration-A Beginners Guide, Sixth edition-Wale Soyinka

# Mahatma Gandhi University
# Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | **BSc (Hons) Cyber Forensics** | | | | | |
| **Course Name** | **SOCIAL MEDIA SECURITY** (Network Security Specialization) | | | | | |
| **Type of Course** | DSE | | | | | |
| **Course Code** | MG6DSECFS300 | | | | | |
| **Course Level** | 300 -399 | | | | | |
| **Course Summary** | In depth Knowledge to navigate the social media landscape securely,Protecting both personal and Professional information from a variety of security and privacy threats | | | | | |
| **Semester** | VI | Credits | | | 4 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 4 | 0 | 0 | | 60 |
| **Pre-requisites, if any** | | | | | | |

**COURSE OUTCOMES (CO)**

| CO No. | Expected Course Outcomes upon completion of this course , the students will be able to: | Learning Domains * | PO No |
|---|---|---|---|
| 1 | Understand the key concepts and challenges in social network security. | Understand | 1,2 |
| 2 | Apply multi-factor authentication in social network environments. | Apply | 1,2,3 |
| 3 | Apply data encryption and anonymization techniques for protecting social network data. | Apply | 1,2,3 |
| 4 | Develop and implement incident response strategies for social network security.. | Create | 2,3 |
| ****Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)*** | | | |

## COURSE CONTENT

### Content for Classroom transaction (Units)

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Overview of social network security concepts | 5 | 1 |
|  | 1.2 | Identify common threats and vulnerabilities in social networks. | 5 | 1,2 |
|  | 1.3 | Develop and implement security policies for social media platforms. | 5 | 4 |
| 2 | 2.1 | User Identity Verification in Social Media | 5 | 2 |
|  | 2.2 | Access Control Mechanisms,Permissions and Role-Based Access Control | 5 | 2 |
|  | 2.3 | Multi-Factor Authentication in Social Networks | 5 | 2 |
| 3 | 3.1 | Privacy Challenges in Social Media | 5 | 1,2 |
|  | 3.2 | Data Encryption and Anonymization Techniques | 5 | 3,4 |
|  | 3.3 | Regulatory Compliance in Social Network Data Protection, Ethical Handling of User Data in Social Networks | 5 | 3,4 |
| 4 | 4.1 | Detecting and Responding to Security Incidents in Social Networks | 5 | 3,4 |
|  | 4.2 | Crisis Communication Strategies for Social Media, Reputation Management in the Event of a Security Breach | 5 | 3,4 |

|  |  |  |  |  |
|---|---|---|---|---|
|  | 4.3 | Legal and Regulatory Requirements for Incident Response in Social Networks | 5 | 3 |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Evaluation is internal. |  |  |

|  |  |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 30 Marks**<br>**Written Test / Seminar / Viva/ Assignments** |
|  | **B. Semester End examination 70 Marks Time: 2 hrs**<br>**Written test** |

**TEXTBOOKS :**

1. "Social Network Security: Principles and Practices" by John A. Smith
2. Identity Management in Social Networks" by Robert Johnson
3. "Securing Access in Social Media" by Samantha Green
4. "Privacy in Social Networks" by Jennifer Davis
5. "Data Protection Strategies for Social Media Platforms" by Michael Brown
6. "Social Media Incident Response Handbook" by Jessica Anderson
7. "Crisis Management in the Age of Social Networks" by Mark Taylor

**SUGGESTED READINGS**

1. "Cyber Ethics: Social Media Edition" by Emily White
2. **"Social Network Security Essentials" by Richard T. McCoy**
3. **Social Media Security and Privacy: Concepts, Methodologies, Tools, and Applications" edited by Hamid Nemati**
4. **"Handbook of Social Media and the Law" by Laura Scaife**

# Mahatma Gandhi University
# Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | **BSc (Hons) Cyber Forensics** | | | | | |
| **Course Name** | **COMPILER DESIGN** (Operating System Architecture Specialization) | | | | | |
| **Type of Course** | DSE | | | | | |
| **Course Code** | MG6DSECFS301 | | | | | |
| **Course Level** | **300 - 399** | | | | | |
| **Course Summary** | This syllabus provide a theoretical knowledge and the ability to apply compiler design principles to real-world scenarios. | | | | | |
| **Semester** | VI | Credits | | | 4 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 4 | 0 | 0 | | 60 |
| **Pre-requisites, if any** | | | | | | |

**COURSE OUTCOMES (CO)**

| **CO No.** | **Expected Course Outcomes upon completion of this course , the students will be able to:** | **Learning Domains *** | **PO No** |
|---|---|---|---|
| 1 | Understand the basic concepts and principles compiler design | Understand | 1 |
| 2 | Analyse the construction of Finite Automata and the application of the Longest Match Rule in lexical analysis. | Analyse | 2 |
| 3 | Evaluate, analyse and understand semantic analysis. | Evaluate | 2 |
| 4 | Familiarize code generation and optimization. | Create | 2 |
| ***Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)*** | | | |

**COURSE CONTENT**

**Content for Classroom transaction (Units)**

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | COMPILER DESIGN – OVERVIEW : Language Processing System, Pre-processor | 2 | 1 |
| | 1.2 | Interpreter, Assembler , Linker, Loader, Cross-compiler, Source-to-source Compiler | 3 | 1 |
| | 1.3 | ARCHITECTURE,PHASES OF COMPILER: Lexical Analysis, Syntax Analysis, Semantic Analysis , Intermediate Code Generation, Code Optimization, Code Generation, Symbol Table | 5 | 1,2 |
| 2 | 2.1 | LEXICAL ANALYSIS: Tokens, Specifications of Tokens: Alphabets, Strings, Special Symbols, Language | 6 | 1,2 |
| | 2.2 | REGULAR EXPRESSIONS : Operations, Notations, Precedence and Associativity, FINITE AUTOMATA: Finite Automata Construction, Longest Match Rule | 7 | 3 |
| | 2.3 | SYNTAX ANALYSIS ·: Context-Free Grammar, Syntax Analyzers, Derivation, Parse Tree, First and Follow Sets, Limitations of Syntax Analyzers·, TYPES OF PARSING | 7 | 2 |
| 3 | 3.1 | SEMANTIC ANALYSIS ·: Semantics, Semantic Errors, Attribute Grammar, S-attributed SDT, L-attributed SDT | 6 | 1 |
| | 3.2 | SYMBOL TABLE: Implementation, Operations | 5 | 4 |

| | | | | |
|---|---|---|---|---|
| | 3.3 | INTERMEDIATE CODE GENERATION: Intermediate Representation, Three-Address Code, Declarations | 6 | 4 |
| 4 | 4.1 | CODE GENERATION: Directed Acyclic Graph, Peephole Optimization, Code Generator, Code Generation | 6 | 1,3 |
| | 4.2 | CODE OPTIMIZATION: Machine-independent Optimization, Machine-dependent Optimization, Basic Blocks, Loop Optimization, Dead-code Elimination, Partial Redundancy. | 7 | 2 |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Evaluation is internal. | | |

| | |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 30 Marks**<br>**Written Test / Seminar / Viva/ Assignments** |
| | **B. Semester End examination 70 Marks Time:2 hrs**<br>**Written test** |

**REFERENCES**

1. Compilers: Principles, Techniques, And Tools" (Dragon Book) By Alfred V. Aho, Monica S. Lam, Ravi Sethi, And Jeffrey D. Ullman Pearson Education 2nd Edition.
2. "Introduction to Compiler Design" By Thomas Pittman, James Peters
3. Compilers: Principles Of Compiler Design" By Alfred V. Aho, Jeffrey D. Ullman Publisher:Narosa Publishing House
4. Engineering A Compiler" By Keith D. Cooper, Linda Torczon 2nd Edition. Publisher:Elsevier Science ISBN:9780080916613, 0080916619

**Mahatma Gandhi University**
**Kottayam**

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | **BSc (Hons) Cyber Forensics** | | | | | |
| **Course Name** | **SECURITY AND PRIVACY IN CLOUD COMPUTING** (Modern Computing with Resource Sharing Specialization) | | | | | |
| **Type of Course** | DSE | | | | | |
| **Course Code** | MG6DSECFS302 | | | | | |
| **Course Level** | **300 - 399** | | | | | |
| **Course Summary** | Aims is to acquire the knowledge and skills needed to secure cloud environments, address privacy concerns, and navigate the complex landscape of cloud security. The course should prepare them for roles in cloud security, compliance, and risk management. | | | | | |
| **Semester** | VI | Credits | | | 4 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 4 | 0 | 0 | 0 | 60 |
| **Pre-requisites, if any** | | | | | | |

**COURSE OUTCOMES (CO)**

| CO No. | Expected Course Outcomes upon completion of this course , the students will be able to: | Learning Domains * | PO No |
|---|---|---|---|
| 1 | Familiarize Cloud Computing Basics: Define cloud computing and explain its fundamental concepts. | Understand | 1 |
| 2 | Apply data encryption and masking techniques in cloud environments. Implement database security best practices. | Analyse | 2 |
| 3 | Create comprehensive incident response plans for cloud-based systems. | Evaluate | 2 |
| 4 | Evaluate Serverless Computing Security and Implement security measures for serverless architectures | Apply | 2 |

***Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)***

**COURSE CONTENT**

**Content for Classroom transaction (Units)**

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Introduction to Cloud Computing and Security Fundamentals | 3 | 1 |
| | 1.2 | Overview of Cloud Computing, Service Models (IaaS, PaaS, SaaS),Deployment Models (Public, Private, Hybrid), | 5 | 1,2 |
| | 1.3 | Key Security Concepts: Confidentiality, Integrity, Availability (CIA),Threats and Attacks in Cloud Computing,Security in Virtualization | 4 | 1 |
| | 1.4 | Network Security in the Cloud ,Identity and Access Management (IAM),Encryption and Key Management, Security Groups and Firewalls | 3 | 3 |
| 2 | 2.1 | Data Security in the Cloud :Data Encryption and Masking, Database Security, Data Loss Prevention (DLP),Backup and Disaster Recovery. | 7 | 1,2,3 |
| | 2.2 | Privacy in Cloud Computing: Privacy Concerns and Regulations ,Legal and Compliance Issues ,Privacy by Design ,Privacy-Preserving Technologies | 8 | 1,2 |
| 3 | 3.1 | Introduction to Cloud Security Standards:Definition and importance of cloud security standards. | 4 | 1 |
| | 3.2 | ISO 27001 in Cloud Security, NIST Framework for Cloud Security | 2 | 2 |
| | 3.3 | Introduction to Cloud Security Alliance (CSA), CSA Cloud Controls Matrix (CCM), | 2 | 1,2 |
| | 3.4 | CSA Security Guidance for Critical Areas of Focus in Cloud Computing, Overview of Cloud Security Certifications, Certified Cloud Security Professional (CCSP),<br>AWS Certified Security,<br>Other Cloud Security Certifications | 7 | 1,2,3 |

| | | | | |
|---|---|---|---|---|
| 4 | 4.1 | Server less Computing Security | 3 | 1,2,3 |
| | 4.2 | Ephemeral Nature of Server less Functions: | 4 | 1,2,3 |
| | 4.3 | AI and Machine Learning in Cloud Security | 4 | 2,3 |
| | 4.4 | Block chain for Cloud Security | 4 | 3,4 |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Evaluation is internal. | | |

| | |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 30 Marks**<br>**Written Test / Seminar / Viva/ Assignments** |
| | **B. Semester End examination 70 Marks time : 2hrs**<br>**Written test** |

**Text Book**

1. Cloud Security and Privacy: An  Enterprise perspective on Risks and Compliance” by Tim Mather, Subra Kumaraswamy, Shahed Latif

**REFERENCES**

1. CCSP Certified Cloud Security Professional All-in-One Exam Guide-Authors: Daniel Carter- 2nd Edition, Publisher-McGraw Hill.
2. Cloud Security and Privacy: An International Guide to Policy and Technology-Authors: Tim Mather, Subra Kumaraswamy, Shahed Latif,1st edition, publisher -O'Reilly Media
3. Security Engineering: A Guide to Building Dependable Distributed Systems-Author: Ross J. Anderson,3rd edition, Publisher-Wiley
4. Security Engineering: A Guide to Building Dependable Distributed Systems-Author: Ross J. Anderson published by **John Wiley & Sons.**
5. Guide to Cloud Computing: Principles and Practice-Authors: Richard Hill, George Reese, Ben Sweat , Springer Science & Business Media 2012

# Mahatma Gandhi University
# Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | **BSc (Hons) Cyber Forensics** | | | | | |
| **Course Name** | **SECURITY SCRIPTING USING RUBY** | | | | | |
| **Type of Course** | DSE | | | | | |
| **Course Code** | MG6DSECFS303 | | | | | |
| **Course Level** | **300 - 399** | | | | | |
| **Course Summary** | This course equips students with a strong foundation in Ruby programming and an in-depth understanding of the Ruby on Rails framework. | | | | | |
| **Semester** | VI | Credits | | | 4 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 3 | 1 | 0 | 0 | 60 |
| **Pre-requisites, if any** | | | | | | |

**COURSE OUTCOMES (CO)**

| CO No. | Expected Course Outcomes upon completion of this course , the students will be able to: | Learning Domains * | PO No |
|---|---|---|---|
| 1 | Realize the concept of OOP in Ruby | Understand | 1 |
| 2 | Apply the application of oops principles | Apply | 1,3 |
| 3 | Analyse the structure and execution flow of Ruby programs. | Analyse | 1,2,3 |
| 4 | Assess and Evaluate the effectiveness of different Ruby programming constructs in various scenarios. | Evaluate | 2,3 |
| ***Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)*** | | | |

**COURSE CONTENT**

**Content for Classroom transaction (Units)**

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Introduction<br>Features of Ruby<br>Ruby Installation on Linux and Windows<br>The Structure and Execution of Ruby Programs | 4 | 1 |
| | 1.2 | Constants and Literals<br>Data types | 3 | 1 |
| | 1.3 | Operators and Expressions<br>Statements and Control Structures | 5 | 1,2 |
| | 1.4 | Methods | 3 | 1,2 |
| 2 | 2.1 | Arrays and Hashes | 6 | 1,2 |
| | 2.2 | Class, Method Visibility, OOP Concepts | 6 | 1,2,3 |
| | 2.3 | Regular Expressions | 3 | 3 |
| 3 | 3.1 | Exception and Exception Handling<br>Exception Classes and Exception Objects | 9 | 1,2 |
| | 3.2 | File Introduction, Reading File<br>Writing File | 6 | 2 |
| 4 | 4.1 | Working with Ruby Gems<br>Gem commands | 5 | 3,4 |
| | 4.2 | Working in socket with Ruby<br>Implementing secure communication with SSL/TLS | 10 | 3,4 |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned. Evaluation is internal. | | |

| | |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture and Practical** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 30 Marks**<br>**Written Test / Seminar / Viva/ Assignments** |

| | |
|---|---|
| | |
| | **B. Semester End examination 70 Marks,Time : 2hrs**<br>**Written test** |

**References:**

1. The Ruby Programming Language First Edition O'Reilly
2. The Well-Grounded Rubyist Third Edition by David A. Black
3. Beginning Ruby Second Edition by Peter Cooper
4. Learn Ruby on Rails: Book two by Daniel Kehoe RailsApps

# Mahatma Gandhi University
# Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | **BSc (Hons) Cyber Forensics** | | | | | |
| **Course Name** | **SECURITY SCRIPTING USING PERL** | | | | | |
| **Type of Course** | DSE | | | | | |
| **Course Code** | MG6DSECFS304 | | | | | |
| **Course Level** | **300 - 399** | | | | | |
| **Course Summary** | Develop basic understanding of web development in PERL and able to design web application in real world scenario. | | | | | |
| **Semester** | VI | Credits | | | 4 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 3 | 1 | 0 | 0 | 60 |
| **Pre-requisites, if any** | | | | | | |

**COURSE OUTCOMES (CO)**

| CO No. | Expected Course Outcomes upon completion of this course , the students will be able to: | Learning Domains * | PO No |
|---|---|---|---|
| 1 | Familiarise the overview of security scripting and its relevance. | Understand | 1 |
| 2 | Apply the knowledge to write simple Perl programs with basic I/O operations. | Apply | 1,2 |
| 3 | Analyse operator procedures and conditional statements file and directory security mechanisms using Perl. | Analyse | 2,3 |
| 4 | Measure the efficiency of loop control mechanisms and the effectiveness of regular expressions in string manipulation. | Evaluate | 1,2,3 |
| ***Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)*** | | | |

**COURSE CONTENT**

**Content for Classroom transaction (Units)**

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Introduction to Perl | 2 | 1 |
| | 1.2 | Basic I/O, Variables, and Backslash Interpolation | 3 | 2 |
| | 1.3 | Scalar/List Control Operators, Operator Procedure, if unless | 4 | 2 |
| | 1.4 | Loops, Loop Control | 3 | 2,4 |
| | 1.5 | Debugging Perl Scripts | 3 | 2 |
| 2 | 2.1 | Built-in Functions in Perl | 5 | 1,2 |
| | 2.2 | Perl Functions | 3 | 2 |
| | 2.3 | Regular Expressions Pattern Matching, Operators | 4 | 2,3,4 |
| | 2.4 | Meta character and Meta symbols, Character Classes, Quantifiers | 3 | 2,3 |
| 3 | 3.1 | Subroutines Syntax, Semantics, Parsing References | 4 | 4 |
| | 3.2 | Prototypes, Subroutine Attributes, Formats Format Variables | 3 | 4 |
| | 3.3 | References Creating References, Using Hard References | 3 | 2,3,4 |
| | 3.4 | Symbolic References, Braces, Brackets, and Quotes | 3 | 2 |
| | 3.5 | Data Structure Arrays of Arrays, Hashes of Arrays | 2 | 3.4 |
| 4 | 4.1 | Here Docs, More CGI Emailing, Cookies | 4 | 2,4 |
| | 4.2 | File Uploading, E-mail, Security Scripting Overview | 5 | 2 |

|  |  |  |  |  |
|---|---|---|---|---|
|  | 4.3 | File and Directory Security, Network Security with Perl | 4 | 2 |
|  | 4.4 | Perl for Web Security Basics | 2 | 1,4 |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Evaluation is internal. |  |  |

|  |  |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>Lecture and Practical |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 30 Marks**<br>**Written Test / Seminar / Viva/ Assignments** |
|  | **B. Semester End examination 70 Marks Time: 2 hrs**<br>**Written test** |

**References**

1. Tom Christiansen, Brian D Foy, Larry Wall, Jon Orwant, Programming Perl, O'Reily, 3rd Edition, 2010
2. Scott Guelich, CGI Programming with Perl, O'Reily, et al., SPDpublication, 2nd Edition, 2008.
3. Tom Christiansen, Nathan Torkington , "Perl Cookbook", 2nd Edition.
4. Scott Guelich, Shishir Gundavaram, Gunther Birznieks "CGI Programming with Perl", 2nd Edition.
5. Lincoln D. Stein "Network Programming with Perl", 3rd Edition.

# Mahatma Gandhi University
# Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | **BSc (Hons) Cyber Forensics** | | | | | |
| **Course Name** | **SECURITY SCRIPTING USING NODE.JS** | | | | | |
| **Type of Course** | DSE | | | | | |
| **Course Code** | MG6DSECFS305 | | | | | |
| **Course Level** | **300 -399** | | | | | |
| **Course Summary** | This course provides a comprehensive understanding of JavaScript and Node.js, covering fundamental concepts, application development, module usage, and file system operations. | | | | | |
| **Semester** | VI | Credits | | | 4 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 3 | 1 | 0 | 0 | 60 |
| **Pre-requisites, if any** | | | | | | |

**COURSE OUTCOMES (CO)**

| CO No. | Expected Course Outcomes upon completion of this course , the students will be able to: | Learning Domains * | PO No |
|---|---|---|---|
| 1 | Aware of the mastery of java script and fundamentals. | Understand (U) | 1 |
| 2 | Analyse the application of express.JS framework for building web application | Analyse(An) | 2 |
| 3 | Apply JavaScript for form validation and event handling in HTML forms | Apply(A) | 2 |
| 4 | Measure the installation and usage of Node.js on Windows. | Evaluate(E) | 2, 3 |
| ***Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)*** | | | |

**COURSE CONTENT**

**Content for Classroom transaction (Units)**

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Introduction to Java Script | 5 | 1 |
| | 1.2 | JavaScript Fundamentals | 5 | 1 |
| | 1.3 | Events and Popup Boxes | 2 | 1,2 |
| | 1.4 | HTML Forms and Validation | 3 | 3,4 |
| 2 | 2.1 | Features and Advantages of Node.js | 3 | 1 |
| | 2.2 | Environment Setup and Basics | 4 | 2,3 |
| | 2.3 | Asynchronous Programming | 4 | 3 |
| | 2.4 | Node.js Installation | 4 | 3,4 |
| 3 | 3.1 | Primitive Types and Object Literal | 3 | 1,2,3 |
| | 3.2 | Functions, Buffer, and Global Scope | 4 | 2,3 |
| | 3.3 | Module Types and Exports | 4 | 2 |
| | 3.4 | Using Modules and NPM | 4 | 3,4 |
| 4 | 4.1 | Handling HTTP Requests and File Operations | 5 | 2,3 |
| | 4.2 | Node.js File System Module and IO Operations | 5 | 3 |
| | 4.3 | File System Manipulation and Directory Operations | 5 | 3,4 |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Evaluation is internal. | | |

| | |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture and Practical** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 30 Marks**<br>**Written Test / Seminar / Viva/ Assignments** |
| | **B. Semester End examination 70 Marks Time: 2 hrs**<br>**Written test** |

**References**

1. Professional JavaScript for Web Developers 3rd Edition , Nicholas C. Zakas.
2. JavaScript and JQuery: Interactive Front-End Web Development 1st Edition 2014, Jon Duckett.
3. Advanced [removed] Speed Up Web Development with the Powerful Features and Benefits of JavaScript, 1st edition 2019, Zachary Shute.
4. Dhruti Shah, “Node.JS Guidebook”, BPB Publications,1st Edition 2018.
5. Basarat Ali Syed, Beginning Node.js, A press, 2014, Trade Paperback, New Edition.

**WEB REFERENCES :**

1. https://nodejs.org/en/docs

# Mahatma Gandhi University Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | **BSc (Hons) Cyber Forensics** | | | | | |
| **Course Name** | **PENETRATION TESTING TOOLS** | | | | | |
| **Type of Course** | SEC | | | | | |
| **Course Code** | MG6SECCFS300 | | | | | |
| **Course Level** | **300 -399** | | | | | |
| **Course Summary** | Able to identify and address security vulnerabilities, helping organizations strengthen their defense against cyber threats. | | | | | |
| **Semester** | VI | Credits | | | 3 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 2 | 0 | 1 | 0 | 60 |
| **Pre-requisites, if any** | | | | | | |

**COURSE OUTCOMES (CO)**

| **CO No.** | **Expected Course Outcomes upon completion of this course , the students will be able to:** | **Learning Domains *** | **PO No** |
|---|---|---|---|
| 1 | Realize the penetration testing methodologies including reconnaissance, scanning, exploitation and post-exploitation. | Understand | 1 |
| 2 | Examine port scanning, vulnerability scanning, and exploitation in penetration testing, and understanding social engineering tool kits | Analyse | 2 |
| 3 | Study the wireless attacks and utilize hands-on tools to gather information and exploit vulnerabilities | Analyse | 2,3 |
| 4 | Make use of theoretical knowledge in a hands-on lab to explore various tools used in different phases of penetration testing. | Apply | 3,4 |
| ***Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)*** | | | |

**COURSE CONTENT**

**Content for Classroom transaction (Units)**

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Understanding Penetration testing-Phases of pentesting | 4 | 1 |
| | 1.2 | Setting up virtual machine-using Kali Linux | 4 | 1,4 |
| | 1.3 | Information Gathering -Whois, Netcraft, Extracting information from DNS, The Harvester, HTTrack, MetaGooFil | 4 | 1,2 |
| 2 | 2.1 | Discovery and scanning- pings and pin sweeps, port scanning, Nessus | 2 | 1,2 |
| | 2.2 | Vulnerability Scanning-BurpSuit, Aircrack | 2 | 2,3 |
| | 2.3 | Exploitation-Gaining access to remote services, Payload generation-Metasploit, BeEF | 2 | 2,3 |
| | 2.4 | The Nmap Scripting Engine, Running a single NSE script | 2 | 2 |
| | 2.5 | Password attacks-types of attacks | 2 | 2 |
| | 2.6 | Social Engineering-SE Toolkit, Spear phishing, Mass Email Attacks, Zphisher | 2 | 2,3 |
| 3 | 3.1 | Wireless attacks-setting up,Monitor mode,Capturing packets | 2 | 3 |
| | 3.2 | Wired Equivalent Privacy, Wi-Fi Protected Access ,WPA2, Wi-Fi Protected Setup ,The Smartphone Pentest Framework | 2 | 3 |
| | 3.4 | Maintaining Access with Backdoors and Rootkits and how to create pentesting report | 2 | 1,3 |
| | 3.5 | Apply theoretical knowledge into hands-on lab practical :<br>Information Gathering tools: Whois,Netcraft,Nslookup,Shodan,Maltego, Wayback /or can add any other tools | 8 | 3,4 |
| | 3.6 | Discovery and Scanning tools: Angry IP scanner, Super Scan, Port scanning-Nmap, Nessus/ or can add any other tools | 7 | 3,4 |

|  |  |  |  |  |
|---|---|---|---|---|
| 4 | 4.1 | Apply hands-on lab practical:<br>Vulnerability Scanning tools: BurpSuit, OpenVAS, Netsparker, Aircrack / or can add any other tools | 5 | 4 |
|  | 4.2 | Exploitation tools: Metasploit ,BeEF , Social engineering toolkit – Zphisher/Blackeye/or any other phishing tool | 5 | 4 |
|  | 4.3 | Generate a penetration testing report based on these practical activities | 5 | 4 |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Valuation is internal. |  |  |

|  |  |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture and Practical** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 15 Marks**<br>**Written Test / Seminar / Viva/ Assignments**<br>**Practical Marks 15 Marks** |
|  | **B. Semester End examination 35 Marks Time: 1.5 hours**<br>**Written test**<br>**Practical Examination 35 Marks** |

**References:**

1. The basics of hacking and penetration testing by Patrick engebreston
2. Penetration testing A Hands-On Introduction to Hacking, Georgia Weidman, William Pollock,2014
3. Metasploit: The Penetration Tester's Guideby David Kennedy, Jim O'Gorman, Devon Kearns, and Mati Aharoni
4. Penetration Testing: Procedures & Methodologiesby EC-Council
5. The Web Application Hacker's Handbook: Finding and Exploiting Security Flaws" by Dafydd Stuttard and Marcus Pinto

|  |  |
|---|---|
|  | **Mahatma Gandhi University<br>Kottayam** |

|  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|
| **Programme** | **BSc (Hons) Cyber Forensics** |  |  |  |  |  |
| **Course Name** | **ARTIFICIAL INTELLIGENCE ETHICS** |  |  |  |  |  |
| **Type of Course** | VAC |  |  |  |  |  |
| **Course Code** | MG6VACCFS300 |  |  |  |  |  |
| **Course Level** | **300 -399** |  |  |  |  |  |
| **Course Summary** | Aim is to equip with a comprehensive understanding of the ethical dimensions of AI and be capable of critical assessing, designing, and implementing AI systems with ethical considerations in mind. This course gives an awareness of the broader societal implications of AI and be prepared to contribute to ethical decision-making in the field. |  |  |  |  |  |
| **Semester** | VI | Credits |  |  | 3 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others |  |
|  |  | 3 | 0 | 0 | 0 | 45 |
| **Pre-requisites, if any** |  |  |  |  |  |  |

**COURSE OUTCOMES (CO)**

| CO No. | Expected Course Outcomes upon completion of this course , the students will be able to: | Learning Domains * | PO No |
|---|---|---|---|
| 1 | Familiarise the Artificial Intelligence and the ethical Considerations of AI technologies. | Understand | 1,8 |
| 2 | Recognize Framework, Concepts, Standards and regulations of AI | Understand | 1,2,8 |
| 3 | Study the different Perspectives of AI Ethics. | Analyse | 2,6,8 |
| 4 | Explore the real-world cases where AI ethics played a significant role. | Analyse | 1,2,8 |
| ***Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)** |  |  |  |

**COURSE CONTENT**

**Content for Classroom transaction (Units)**

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Artificial Intelligence: Introduction to Artificial Intelligence, Goal of AI. | 2 | 1 |
| | 1.2 | Applications of AI, Role of Artificial Intelligence in Human Life. | 3 | 1 |
| | 1.3 | Artificial Intelligence and Ethics: Introduction to Ethics Of AI, Why Ethics in AI? Understanding Ethics, Ethical Considerations of AI. | 4 | 1 |
| | 1.4 | Current Initiatives in AI and Ethics, Ethical Issues with our relationship with artificial Entities | 3 | 1 |
| 2 | 2.1 | Framework And Mode: AI Governance by Human-right centred design, deliberation and oversight. | 2 | 2 |
| | 2.2 | Normative mode. Role of professional norms in the governance of artificial intelligence. | 3 | 2 |
| | 2.3 | Concepts And Issues: Accountability in Computer Systems, Transparency, Responsibility and AI. | 3 | 2 |
| | 2.4 | Race and Gender, AI as a moral right-holder, Autonomy, Is Human Judgement necessary? Artificial Intelligence, Algorithmic Governance and the Law. AI standards and regulations. | 4 | 2 |
| 3 | 3.1 | Perspectives And Approaches: Perspectives on Ethics of AI- Computer Science. | 3 | 3 |
| | 3.2 | Human centred Approach to AI Ethics: A perspective from cognitive Science. | 3 | 3 |
| | 3.3 | Integrating ethical values and economic value to steer progress in artificial intelligence. | 3 | 3 |
| | 3.4 | Automating origination: Perspective from humanities. | 3 | 3 |
| 4 | 4.1 | Cases And Application: Ethics of Artificial Intelligence in Transport. Ethical AI in Military. Ethical AI in Biomedical research, Patient Care, Public Health. | 5 | 4 |
| | 4.2 | Ethics of AI in LAW: Basic questions. Beyond Bias: “Ethical AI” in criminal LAW. | 4 | 4 |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Evaluation is internal. | | |

| | |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**C. Continuous Comprehensive Assessment (CCA) 25 Marks**<br>**Written Test / Seminar / Viva/ Assignments** |
| | **D. Semester End examination 50 Marks Time: 1.5 hours**<br>**Written test** |

**References:**

1. S. Russell and P. Norvig, "Artificial Intelligence: A Modern Approach, Prentice Hall, Third Edition, 2009.
2. Paula Boddington, ―Towards a Code of Ethics for Artificial Intelligence Springer, 2017
3. Markus D. Dubber, Frank Pasquale, Sunit Das, ―The Oxford Handbook of Ethics of AI, Oxford University Press Edited book, 2020
4. S. Matthew Liao, ―Ethics of Artificial Intelligence‖, Oxford University Press Edited Book, 2020
5. y. Eleanor Bird, Jasmin Fox-Skelly, Nicola Jenner, Ruth Larbey, Emma Weitkamp and Alan Winfield," The ethics of artificial intelligence: Issues and initiatives", EPRS | European Parliamentary Research Service Scientific Foresight Unit (STOA) PE 634.452 – March 2020

**Web Link:**

1. https://ijrti.org/papers/IJRTI1808022.pdf
2. https://www.cs.buap.mx/~aolvera/IA/2016_Applications%20of%20IA.pdf
3. https://www.spiceworks.com/tech/artificial-intelligence/articles/what-is-ai/

# SEMESTER 7

# Mahatma Gandhi University
# Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | **BSc (Hons) CYBER FORENSICS** | | | | | |
| **Course Name** | **MACHINE LEARNING USING PYTHON** | | | | | |
| **Type of Course** | **DCC** | | | | | |
| **Course Code** | MG7DCCCFS400 | | | | | |
| **Course Level** | **400 - 499** | | | | | |
| **Course Summary** | Aim to provide students with the necessary knowledge and skills to apply machine learning techniques to real-world problems using Python. | | | | | |
| **Semester** | VII | Credits | | | 4 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 3 | 0 | 1 | | 75 |
| | | | | | | |

## COURSE OUTCOMES (CO)

| CO No. | Expected Course Outcomes upon completion of this course , the students will be able to: | Learning Domains * | | PO No |
|---|---|---|---|---|
| 1 | Familiarize with Machine Learning | Understand | | 1 |
| 2 | Analyse various learning methods | Analyse | | 2 |
| 3 | Review and visualize the data analysis with Python | Apply | | 2 |
| 4 | Implement Machine Learning concepts using Python | Create | | 2 |
| | ***Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)*** | | | |

## COURSE CONTENT

**Content for Classroom transaction (Units)**

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | **Overview of Machine Learning** - Definition and applications, Importance and impact. | 3 | 1 |
| | 1.2 | **Types of Machine Learning** - Supervised learning, Unsupervised learning, Reinforcement learning. | 6 | 1 |
| | 1.3 | **Basic Concepts** - Features and labels, Training and testing data, Model, prediction, and evaluation. | 5 | 1 |
| 2 | 2.1 | **Supervised Learning:**<br>Regression - Introduction to Regression, Linear regression basics, Simple and multiple linear regression | 7 | 1 |
| | 2.2 | Model Evaluation - Mean Squared Error (MSE), R-squared<br>Classification - Introduction to Classification, Logistic regression, Decision trees | 7 | 1, 2 |
| | 2.3 | Model Evaluation for Classification - Confusion matrix, Accuracy, precision, recall. | 4 | 1, 2 |
| 3 | 3.1 | NumPy and Pandas, Arrays and DataFrames, Basic operations for data manipulation, Matplotlib, Data visualization basics. | 8 | 3 |
| | 3.2 | Exploratory Data Analysis (EDA) and Data Preprocessing, EDA with Pandas and Matplotlib, Understanding and summarizing data, Data Preprocessing, Handling missing values. | 5 | 3,1 |
| 4 | 4.1 | Arrays and DataFrames, NumPy and Pandas | 4 | 4 |
| | 4.2 | Basic operations for data manipulation | 8 | 4 |
| | 4.3 | Data visualization basics - Matplotlib, Scatterplot, Line chart, bar chart, histogram etc. | 8 | 4 |
| | 4.4 | Exploratory Data Analysis (EDA) and Data Pre-processing. | 10 | 4 |

|  |  |  |  |  |
|---|---|---|---|---|
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Evaluation is internal. |  |  |

|  |  |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture and Practical** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**E. Continuous Comprehensive Assessment (CCA) 25 Marks**<br>**Written Test / Seminar / Viva/ Assignments**<br>**Practical 15 Marks** |
|  | **F. Semester End examination 50 Marks Time: 1.5 hours**<br>**Written test**<br>**Practical Examination 35 Marks** |

**References**

1. Machine Learning - Saikat Dutt, Subramanian Chandramouli, Amit Kumar Das, Pearson Education
2. Introduction to Machine Learning with Python A Guide for Data Scientists - Andreas C. Müller and Sarah Guido, O'Reilly Media, Inc.

**SUGGESTED READINGS**

**Basic operations for data manipulation -**

1. **https://www.analyticsvidhya.com/blog/2016/01/12-pandas-techniques-python-data-manipulation/**

**Data Visualization Basics –**

2. **https://gilberttanner.com/blog/introduction-to-data-visualization-inpython/#:~:text=Data%20visualization%20is%20the%20discipline,with%20lots%20of%20different%20features.**
3. **Exploratory Data Analysis (EDA) and Data Pre-processing -** https://www.analyticsvidhya.com/blog/2022/07/step-by-step-exploratory-data-analysis-eda-using-python/

# Mahatma Gandhi University

# Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | **BSc (Hons) CYBER FORENSICS** | | | | | |
| **Course Name** | **SOFTWARE ENGINEERING** | | | | | |
| **Type of Course** | **DCC** | | | | | |
| **Course Code** | MG7DCCCFS401 | | | | | |
| **Course Level** | **400 - 499** | | | | | |
| **Course Summary** | Aim to provide students with a strong foundation in software engineering, enabling them to contribute effectively to software development projects and adapt to the dynamic nature of the field. Specific outcomes may vary based on the course and institution. | | | | | |
| **Semester** | VII | Credits | | | 4 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 4 | 0 | 0 | | 60 |
| | | | | | | |

**COURSE OUTCOMES (CO)**

| **CO No.** | **Expected Course Outcomes upon completion of this course , the students will be able to:** | **Learning Domains *** | | **PO No** |
|---|---|---|---|---|
| 1 | Recognize various steps of software engineering. | Understand | | 1 |
| 3 | Apply suitable life cycle models to a project. | Apply | | 1,2,9 |
| 5 | Analyze a problem and identify and define the requirements to the problem | Analyze | | 1,2 |
| 6 | Evaluate the design and testing phases of software Engineering | Evaluate | | 1,2 |
| | ***Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)** | | | |

## COURSE CONTENT

### Content for Classroom transaction (Units)

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Introduction to Software Engineering: What is Software Engineering, Program Vs Software, Software process , Software Characteristics, Characteristics of Software Engineering. | 5 | 2 |
| | 1.2 | Brief introduction about product and process | 2 | 2 |
| | 1.2 | Life cycle of a software system. | 2 | 1 |
| 2 | 2.1 | Software life cycle models: Definition, Waterfall model, Spiral model, V model, Incremental and Iterative process model, Prototype Model. | 2 | 1,3 |
| | 2.2 | Introduction to Agile Group-Scrum, XP | 2 | 1,3 |
| | 2.3 | Selection of a life cycle model. | 4 | 3 |
| 3 | 3.1 | Software Requirement Engineering: What is Requirement Engineering, Types of requirements | 4 | 1,5 |
| | 3.2 | Steps in Requirement Engineering Process | 5 | 5 |
| | 3.3 | Project planning- Size estimation, cost estimation. | 5 | 4 |
| | 3.4 | Constructive Cost Model (COCOMO) | 4 | 4 |
| | 4.1 | Software design process: Purpose of software design | 4 | 1,6 |
| | 4.2 | Architectural designs, User interface design, Detailed design. | 5 | 6 |
| | 4.3 | Software Testing: What is testing? Importance of Software Testing, Verification and Validation | 3 | 1,6 |
| | 4.4 | Different Types of Software testing | 4 | 6 |

| | | | | |
|---|---|---|---|---|
| 4 | 4.5 | Levels of Software Testing | 4 | 6 |
| | 4.6 | Black box, White box and Gray box testing | 3 | 6 |
| | 4.7 | Benefits of software testing | 2 | 6 |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Evaluation is internal. | | |

| | |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 30 Marks**<br>**Written Test / Seminar / Viva/ Assignments** |
| | **B. Semester End examination 70 Marks Time: 2 hours**<br>**Written test** |

## REFERENCES

1. Software Engineering ,Roger S . Pressman, Sixth edition, 2004, TataMcgraw - Hill International Edition.
2. Software Engineering Programs Documentation Operating procedures, K.K. Aggarwal&Yogesh Singh,2003, New Age International Publishers
3. Software engineering,Ian Sommerville, Sixth edition,2001,Pearson education Asia.

# Mahatma Gandhi University
# Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | **BSc (Hons) CYBER FORENSICS** | | | | | |
| **Course Name** | **BLOCK CHAIN TECHNOLOGY** | | | | | |
| **Type of Course** | **DCC** | | | | | |
| **Course Code** | MG7DCCCFS402 | | | | | |
| **Course Level** | **400 - 499** | | | | | |
| **Course Summary** | Aim to provide students with a strong foundation in software engineering, enabling them to contribute effectively to software development projects and adapt to the dynamic nature of the field. Specific outcomes may vary based on the course and institution. | | | | | |
| **Semester** | VII | Credits | | | 4 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 4 | 0 | 0 | | 60 |
| | | | | | | |

**COURSE OUTCOMES (CO)**

| **CO No.** | **Expected Course Outcomes upon completion of this course , the students will be able to:** | **Learning Domains *** | | **PO No** |
|---|---|---|---|---|
| 1 | Familiarise Block chain Technology, definition of block chain. | Understand | | 1,2 |
| 2 | Analyse the mining process | Analyse | | 1 |
| 3 | Compare cryptocurrencies and Bitcoin | Evaluate | | 2 |
| 4 | Make use of the knowledge of blockchain components to describe the consensus mechanism. | Apply | | 2 |
| | ***Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)** | | | |

## OURSE CONTENT

### Content for Classroom transaction (Units)

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Foundations of Blockchain Technology (Definition and Historical Evolution) | 4 | 1 |
| | 1.2 | Basics of Decentralized Systems and Components of Blockchain | 4 | 1 |
| | 1.3 | Cryptographic Principles in Blockchain | 3 | 1 |
| | 1.4 | Security in Blockchain Networks and Conclusion | 4 | 1,2 |
| 2 | 2.1 | Fundamentals of Blockchain Technology | 3 | 1,2,3 |
| | 2.2 | Components of Blockchain | 4 | 1 |
| | 2.3 | Cryptography in Blockchain | 4 | 1,2 |
| | 2.4 | Security and Applications in Blockchain Networks | 4 | 1 |
| 3 | 3.1 | Foundations of Blockchain Technology (Definition and Historical Evolution) | 5 | 1 |
| | 3.2 | Basics of Decentralized Systems and Components of Blockchain | 3 | 1,2 |
| | 3.3 | Cryptography in Blockchain | 4 | 1,2 |
| | 3.4 | Security and Applications in Blockchain Networks | 3 | 3 |
| 4 | 4.1 | Scalability Challenges and Solutions | 3 | 1,2 |
| | 4.2 | Applications of Blockchain in Supply Chain Management | 3 | 1,2,3 |
| | 4.3 | Blockchain in Finance, Banking, Healthcare, and Voting Systems | 4 | 2,3 |
| | 4.4 | Challenges, Regulations, and Future Trends | 5 | 3 |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Evaluation is internal. | | |

| | |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 30 Marks**<br>**Written Test / Seminar / Viva/ Assignments** |
| | **B. Semester End examination 70 Marks Time: 2 hours**<br>**Written test** |

**References**

1. "Mastering Bitcoin: Unlocking Digital Cryptocurrencies" by Andreas M. Antonopoulos, second edition, published in 2017. The publisher is O'Reilly Media.
2. "Blockchain Basics: A Non-Technical Introduction in 25 Steps" by Daniel Drescher, 2nd edition in 2022, published by St. Martin's Press.
3. "Blockchain Revolution: How the Technology Behind Bitcoin and Other Cryptocurrencies is Changing the World" by Don Tapscott and Alex Tapscott, published by Penguin Random House. The book was first published in 2016.
4. "Ethereum: Blockchains, Digital Assets, Smart Contracts, Decentralized Autonomous Organizations" by Henning Diedrich, Publisher Wildfire Publishing, 2016
5. "Blockchain by Example: Decentralized applications using Bitcoin, Ethereum, and Hyperledger" by Bellaj Badr and Richard Horrocks **published by** Packt Publishing **on** November 30, 2018
6. "Blockchain Applications: A Hands-On Approach" by Arshdeep Bahga and Vijay Madisetti,, Publisher Arshdeep Bahga, 2017

**SUGGESTED READINGS**

1. "Blockchain Basics: A Non-Technical Introduction in 25 Steps" by Daniel Drescher,Edition: 2nd Edition,Publisher: Apress
2. "Mastering Bitcoin: Unlocking Digital Cryptocurrencies" by Andreas M. Antonopoulos,Edition: 2nd Edition,Publisher: O'Reilly Media
3. "Mastering Ethereum: Building Smart Contracts and DApps" by Andreas M. Antonopoulos and Gavin Wood,Edition: 2nd Edition,Publisher: O'Reilly Media
4. "Blockchain Applications: A Hands-On Approach" by Arshdeep Bahga and Vijay Madisetti,Edition: 1st Edition,Publisher: VPT
5. "Blockchain and Cryptocurrency Explained" by David Chismon,Edition: 1st Edition,Publisher: Wiley
6. "Blockchain Revolution: How the Technology Behind Bitcoin and Other Cryptocurrencies is Changing the World" by Don Tapscott and Alex Tapscott,Edition: 1st Edition,Publisher: Portfolio

# Mahatma Gandhi University
# Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | **BSc (Hons) CYBER FORENSICS** | | | | | |
| **Course Name** | **MULTIMEDIA SECURITY** | | | | | |
| **Type of Course** | DCE | | | | | |
| **Course Code** | MG7DCECFS400 | | | | | |
| **Course Level** | **400 - 499** | | | | | |
| **Course Summary** | This course covers digital video watermarking, quality assessment, and related topics, exploring applications, properties, models, basic message coding, watermarking with side information, authentication, collusion attacks, visibility control, and multimedia forensics, emphasizing practical aspects and evaluation methods. | | | | | |
| **Semester** | VII | Credits | | | 4 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 4 | 0 | 0 | | 60 |
| **Pre-requisites, if any** | | | | | | |

**COURSE OUTCOMES (CO)**

| CO No. | Expected Course Outcomes upon completion of this course , the students will be able to: | Learning Domains * | PO No |
|---|---|---|---|
| 1 | Recall and list application of watermarking and steganography | **Understand** | 1 |
| 2 | Assess the effectiveness of different watermarking and steganographic systems. | **Evaluate** | 1 |
| 3 | Make use of communication-based models of watermarking in practical scenarios | **Apply** | 9 |
| 4 | Model watermark detection using correlation and impact of collusion attacks in digital video watermarking. | **Analyse** | 1 |

***Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)***

**COURSE CONTENT**

**Content for Classroom transaction (Units)**

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Introduction, Applications of Watermarking and Steganography, | 4 | 1 |
|  | 1.2 | Properties of Watermarking Systems, Evaluating Watermarking Systems, | 6 | 2 |
|  | 1.3 | Properties of Steganographic and Steganalysis Systems, Evaluating and Testing Steganographic Systems. | 5 | 2 |
| 2 | 2.1 | Models of Watermarking- Communications, Communication-Based Models of Watermarking, | 3 | 3 |
|  | 2.2 | Geometric Models of Watermarking, Modeling Watermark Detection by Correlation. | 6 | 3 |
|  | 2.3 | Basic Message Coding-Mapping Messages into Message Vectors, Error Correction Coding, | 4 | 2 |
|  | 2.4 | Detecting Multisymbol Watermarks. | 2 | 2 |
| 3 | 3.1 | Watermarking with Side Information-Informed Embedding. | 4 | 3 |
|  | 3.2 | Watermarking Using Side Information | 3 | 3 |
|  | 3.3 | Authentication Watermarkings for Binary Images, | 4 | 3 |
|  | 3.4 | Secure Multimedia Content Distribution Based on Watermarking Technology | 4 | 2 |
| 4 | 4.1 | Digital Video Watermarking and the Collusion Attack | 4 | 4 |
|  | 4.2 | Visibility Control and Quality Assessment of Watermarking and Data Hiding Algorithms, | 4 | 3 |
|  | 4.3 | Steganalysis: Trends and Challenges. | 2 | 1 |
|  | 4.4 | Digital camera Source identification through jepg quantization, Traitor Tracing for Multimedia Forensics, | 3 | 1 |
|  | 4.5 | JPEG2000 encryption. | 2 | 1 |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Evaluation is internal. |  |  |

|  |  |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 30 Marks**<br>**Written Test / Seminar / Viva/ Assignments** |
|  | **B. Semester End examination 70 Marks Time: 2 hours**<br>**Written test** |

**References**

1. Digital Watermarking and Steganography,Second Edition, Ingemar J. Cox,Matthew L. Miller, Jeffrey A. Bloom, Jessica Fridrich, Ton Kalker, 2008 , Elsevier Inc.
2. Multimedia Forensics and Security, Chang-Tsun Li, University of Warwick, UK, 2009 by IGI Global

# Mahatma Gandhi University
# Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | **BSc (Hons) CYBER FORENSICS** | | | | | |
| **Course Name** | **TECHNICAL DOCUMENTATION** | | | | | |
| **Type of Course** | DCE | | | | | |
| **Course Code** | MG7DCECFS401 | | | | | |
| **Course Level** | **400-499** | | | | | |
| **Course Summary** | **This syllabus provides a theoretical knowledge of technical documentation and be able to create high-quality documentation in real-world scenarios.** | | | | | |
| **Semester** | VII | Credits | | | 4 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 4 | 0 | 0 | | 60 |
| **Pre-requisites, if any** | | | | | | |

COURSE OUTCOMES (CO)

| **CO No.** | **Expected Course Outcomes upon completion of this course , the students will be able to:** | **Learning Domains *** | **PO No** |
|---|---|---|---|
| 1 | Examine the fundamental concepts and principles of technical communication, | Understand | 1 |
| 2 | Analyse the historical evolution and significance of technical communication. | Analyse | 2 |
| 3 | Evaluate the impact of effective technical communication on various industries and sectors. | Evaluate | 2 |
| 4 | Develop a brief technical document introducing a complex concept in a clear and understandable manner. | Create | 2 |
| ***Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)*** | | | |

**COURSE CONTENT**

**Content for Classroom transaction (Units)**

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Introduction to Technical Documentation: Overview of Technical Communication, Importance of Effective Documentation, Types of Technical Documents ,Role of Technical Writers | 5 | 1 |
| | 1.2 | Audience Analysis and Purpose: Identifying and Analysing the Audience, Defining Document Purpose and Objectives, Adapting Communication for Different Audiences | 6 | 2 |
| | 1.3 | Case Studies: Analysing Real-world Documents | 5 | 2 |
| 2 | 2.1 | Document Planning and Organization: Defining Document Scope, Document Development Life Cycle, Information Architecture, Creating Document Outlines | 7 | 2,4 |
| | 2.2 | Writing Techniques for Technical Documentation: Clarity and Conciseness, Avoiding Ambiguity | 5 | 4 |
| | 2.3 | Style and Tone in Technical Writing, Grammar and Punctuation | 5 | 4 |
| 3 | 3.1 | Visual Elements in Technical Documentation: Graphics and Illustrations, Document Design and Layout | 5 | 2,3 |
| | 3.2 | Effective Use of Visuals, Document Formatting Guidelines. | 5 | 1 |
| | 3.3 | Collaboration and Revision: Collaborative Writing and Editing Tools, Version Control and Sharing Platforms, Handling Feedback and Revisions, Ensuring Document Accuracy. | 7 | 3 |
| 4 | 4.1 | Advanced Topics in Technical Documentation: API Documentation, Code Documentation Best Practices | 5 | 2,3 |

|  |  |  |  |  |
|---|---|---|---|---|
|  | 4.2 | Regulatory Compliance, Legal and Ethical Considerations. | 5 | 1,2,3 |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Evaluation is internal. |  |  |

|  |  |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 30 Marks**<br>**Written Test / Seminar / Viva/ Assignments** |
|  | **B. Semester End examination 70 Marks Time: 2 hours**<br>**Written test** |

## REFERENCES

1. ”Technical Communication: A Practical Approach" By William S. Pfeiffer And Kaye A. Adkins Pearson Education (2013) 8th Edition.
2. “Technical Writing: Process And Product" By Sharon J. Gerson And Steven M. Gerson 7th Edition.
3. ”Technical Communication Strategies For Today" By Richard Johnson-Sheehan Pearson Education 5th Edition

## SUGGESTED READINGS

1. “Practical Strategies For Technical Communication” By Mike Markel

# Mahatma Gandhi University
# Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | **BSc (Hons) CYBER FORENSICS** | | | | | |
| **Course Name** | **MOBILE FORENSICS** | | | | | |
| **Type of Course** | **DCE** | | | | | |
| **Course Code** | MG7DCECFS402 | | | | | |
| **Course Level** | **400 -499** | | | | | |
| **Course Summary** | Aim to to conduct  mobile forensic investigations, adhere to legal and ethical standards, and effectively communicate their findings in a professional context. | | | | | |
| **Semester** | VII | Credits | | | 4 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 4 | 0 | 0 | | 60 |

**COURSE OUTCOMES (CO)**

| CO No. | Expected Course Outcomes upon completion of this course , the students will be able to: | Learning Domains * | | PO No |
|---|---|---|---|---|
| 1 | Recognize the concept mobile forensics, architecture and file systems, data storage mechanisms, and security features. | Understand | | 1 |
| 2 | Understand the mobile forensics steps and data acquisition types | Understand | | 2 |
| 3 | Analyze the basic concepts of mobile device and procedure in it | Analyze | | 2 |
| 4 | Evaluate the performance of different mobile forensic tools. | Analyze | | 2 |
| | ***Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)*** | | | |

**COURSE CONTENT**

**Content for Classroom transaction (Units)**

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Overview of mobile forensics, history of mobile devices, ethical and legal considerations in mobile forensics, | 8 | 1 |

| | | | | |
|---|---|---|---|---|
| | | architecture and components of iOS and android devices. | | |
| | 1.2 | Mobile device File Systems(FAT, exFAT, EXT4, NTFS, YAFFS, F2FS,APFS). | 4 | 1 |
| | 1.3 | Data storage on mobile devices-SIM card data, phone’s embedded memory, SD card data. | 3 | 1 |
| 2 | 2.1 | Mobile forensics steps-seizure, acquisition, examination and analysis. | 4 | 2 |
| | 2.2 | Common methods of mobile seizure-device documentation,use of Faraday bags, power off and isolate, chain of custody,legal Authorization,data preservation,expert assistance | 4 | 2 |
| | 2.3 | Acquisition types-manual ,logical physical,chip-off . | 7 | 2 |
| 3 | 3.1 | File system analysis, data carving, application-specific data analysis, deleted data recovery analysis. | 3 | 3 |
| | 3.2 | CDR analysis, Sim card analysis | 6 | 3 |
| | 3.3 | Android data analysis and recovery, iOS data analysis and recovery | 6 | 3 |
| 4 | 4.1 | Overview of mobile forensics tools | 3 | 4 |
| | 4.2 | Different mobile forensics tools- Cellebrite UFED ,XRY , Belkasoft , AccessData FTK ,Oxygen Forensic, Andriller, GrayKey, BlackBag Mobilize. | 6 | 4 |

|  |  |  |  |  |
|---|---|---|---|---|
|  | 4.3 | Mobile forensics reporting-purpose of mobile forensics reporting,key components of mobile forensics reports-case overview,examination details, evidence findings, analysis and conclusions, chain of custody, expert opinion. | 6 | 4 |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Evaluation is internal. |  |  |

|  |  |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 30 Marks**<br>**Written Test / Seminar / Viva/ Assignments** |
|  | **B. Semester End examination 70 Marks Time: 2 hours**<br>**Written test** |

**Text Books:**

1. Introduction to mobile forensics,data storage on mobile devices,CDR analysis- https://www.egyankosh.ac.in/bitstream/123456789/50894/1/Block-3.pdf
2. Mobile Forensics – Advanced Investigative Strategies
   By Oleg Afonin and Vladimir Katalov
3. Acquisition types-Manual,Logical,physical,chip-off **acquisition.-** https://www.researchgate.net/publication/261465980_Forensics_data_acquisition_methods_for_mobile_phones
4. "Practical Mobile Forensics - Third Edition" by Rohit Tamma, Oleg Skulkin, Heather Mahalik, Satish Bommisetty
5. "Mobile Forensics – The File Format Handbook" by Christian Hummert, Dirk Pawlaszczyk

# SEMESTER 8

# Mahatma Gandhi University
# Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | **BSc (Hons) Cyber Forensics** | | | | | |
| **Course Name** | **MALWARE AND ATTACKING TECHNIQUES** | | | | | |
| **Type of Course** | DCC | | | | | |
| **Course Code** | MG8DCCCFS400 | | | | | |
| **Course Level** | **400 - 499** | | | | | |
| **Course Summary** | Able to defend against cyber threats and understand the tactics used by attackers with an emphasise on ethical and responsible use of the knowledge gained | | | | | |
| **Semester** | VIII | Credits | | | 4 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 3 | 0 | 1 | | 75 |
| **Pre-requisites, if any** | | | | | | |

## COURSE OUTCOMES (CO)

| **CO No.** | **Expected Course Outcomes upon completion of this course , the students will be able to:** | **Learning Domains *** | **PO No** |
|---|---|---|---|
| 1 | Understand the concept of malware and its role in cybersecurity. | Understand | 1 |
| 2 | Apply techniques to analyse and dissect malicious code to understand its behaviour . | Apply | 2 |
| 3 | Analyse attackers exploit vulnerabilities and defensive strategies . | Analyse | 1,2 |
| 4 | Develop the skill to respond and mitigate the impact of a cyber security incident | Create | 2,3 |
| ***Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)*** | | | |

**COURSE CONTENT**

**Content for Classroom transaction (Units)**

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Definition of Malware, Types of Malware, Malware Life cycle,Common Infection Vectors | 3 | 1 |
| | 1.2 | Malware Analysis Overview ,Malware Analysis Techniques, Behavioural Analysis, Code Reverse Engineering | 3 | 2 |
| | 1.3 | Sandboxing, Automated Analysis Tools, | 3 | 1,2 |
| | 1.4 | Case Studies and Practical Application<br>Real-world Examples, Hands-on Exercises, Ethical Considerations | 6 | 1,2,3 |
| 2 | 2.1 | Overview of Attack Vectors, Social Engineering Attacks, Phishing and Spear Phishing, Watering Hole Attacks | 4 | 2 |
| | 2.2 | Common Vulnerabilities and Exploits, Buffer Overflows, Zero-Day Exploits, Post-Exploitation Techniques | 4 | 2,3 |
| | 2.3 | APT Characteristics, Nation-State Attacks, APT Life cycle | 4 | 1,2,3 |
| | 2.4 | Overview of Offensive Techniques, Ethical Hacking | 3 | 1,2,3 |
| 3 | 3.1 | Overview of Penetration Testing, Ethical Hacking, Legal and Regulatory Framework | 3 | 1,2 |
| | 3.2 | Metasploit Framework, Burp Suite, Other Penetration Testing Tools | 5 | 1,2,3 |
| | 3.3 | Network Penetration Testing, Web Application Penetration Testing, Wireless Network Penetration | 4 | 1,2,3 |

| | | | | |
|---|---|---|---|---|
| | | Testing, Wireless Network Penetration Testing | | |
| | 3.4 | Adversarial Simulation, Cloud Security Testing, Reporting and Documentation | 3 | 2,3 |
| 4 | 4.1 | Overview of Cybersecurity Défense, Intrusion Detection and Prevention Systems (IDPS),Endpoint Protection | 8 | 1,2 |
| | 4.2 | Network Security Fundamentals, Firewalls and Intrusion Prevention Systems (IPS),Secure Network Architecture | 8 | 1,2,3 |
| | 4.3 | Antivirus and Antimalware Solutions, Endpoint Detection and Response (EDR), Application Whitelisting and Least Privilege | 8 | 2,3 |
| | 4.4 | Incident Response Basics, Creating an Incident Response Plan, Effective Incident Handling | 6 | 2,3 |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Evaluation is internal. | | |

| | |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture and Practical** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**C. Continuous Comprehensive Assessment (CCA) 25 Marks**<br>**Written Test / Seminar / Viva/ Assignments**<br>**Practical 15 Marks** |
| | **D. Semester End examination 50 Marks Time: 1.5 hours**<br>**Written test**<br>**Practical Examination 35 Marks** |

**Textbook:**

1 Practical Malware Analysis: The Hands-On Guide to Dissecting Malicious Software-Authors: Michael Sikorski and Andrew Honig.

**References:**

1. Malware Analysis: The Art of Dissecting Malicious Code-Author: Mark Russinovich, Aaron Walters
2. The Web Application Hacker's Handbook: Finding and Exploiting Security Flaws-Authors: Dafydd Stuttard, Marcus Pinto
3. Metasploit: The Penetration Tester's Guide-Authors: David Kennedy, Jim O'Gorman, Devon Kearns, Mati Aharoni
4. Hacking: The Art of Exploitation-Author: Jon Erickson
5. Network Security Essentials: Applications and Standards-Authors: William Stallings
6. Incident Response & Computer Forensics, Third Edition-Author: Jason Luttgens, Matthew Pepe, Kevin Mandia

# Mahatma Gandhi University
# Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | **BSc ( Hons) Cyber Forensics** | | | | | |
| **Course Name** | **BUG BOUNTY** | | | | | |
| **Type of Course** | DCC | | | | | |
| **Course Code** | MG8DCCCFS401 | | | | | |
| **Course Level** | **400 - 499** | | | | | |
| **Course Summary** | Course gives you an overview of what bug bounty hunting is and what the key steps for doing it are, including the techniques, platforms, and tools that are necessary for it and contributing to the improvement of overall cyber security and design a strategy for bug bounty hunting. | | | | | |
| **Semester** | VIII | Credits | | | 4 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 3 | 0 | 1 | | 75 |
| **Pre-requisites, if any** | | | | | | |

**COURSE OUTCOMES (CO)**

| CO No. | Expected Course Outcomes upon completion of this course , the students will be able to: | Learning Domains * | PO No |
|---|---|---|---|
| 1 | Recognize the essentials of bug bounty hunting | Understand | 1 |
| 2 | Apply the learned concept of bug bounty hunting and focus on CRLF bug bounty reports | Apply | 1,2 |
| 3 | Analyse some of the vulnerabilities and attacks for bug bounty | Analyse | 2 |
| 4 | Evaluate tools to detect bugs and develop strategies for bug bounty hunting | Evaluate | 2,3 |
| ****Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)*** | | | |

**COURSE CONTENT**

**Content for Classroom transaction (Units)**

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Basics of Bug Bounty Hunting: Bug bounty hunting platform, Types of bug bounty program, Bug Bounty hunter statistics | 4 | 1 |
| | 1.2 | Methodology: How to become a bug bounty hunter, Rules of bug bounty hunting | 4 | 1,2 |
| | 1.3 | How to Write a Bug Bounty Report: Prerequisites of writing a report | 4 | 1,2 |
| | 1.4 | Salient features of report, Format of a bug bounty report | 3 | 2 |
| 2 | 2.1 | SQL Injection Vulnerabilities: SQL Injection, Types of SQL injection vulnerability, Goals for bug bounty hunters ,uber SQL injection, Zomato SQL Injection, Local Tapiola SQL injection | 5 | 1,2 |
| | 2.2 | Cross-Site Request Forgery: Types of CSRF, Protecting Cookies | 5 | 2 |
| | 2.3 | Detecting and exploring CSRF,Cross-domain policies, Application Logic vulnerabilities | 5 | 2 |
| 3 | 3.1 | SQL Injection: Types of SQL Injection, Fundamental exploitation, Detecting and exploiting SQL injection | 2 | 3 |
| | 3.2 | Cross-Site Scripting Attacks: Types of XSS, Detect XSS bugs, Workflow of an XSS Attack | 2 | 3 |
| | 3.3 | Open Redirect Vulnerabilities External Entity vulnerability | 2 | 3 |
| | 3.4 | Apply theoretical knowledge through hands-on labs and practical | 2 | 3,4 |

| | | | | |
|---|---|---|---|---|
| | | OSINT Top bug bounty hunting tools | | |
| | 3.5 | HTTP Proxies analyzers, automated vulnerability discovery and exploitation, recognize, extensions | 3 | 3,4 |
| | 3.6 | OWASP TOP 10 Tools | 4 | 3,4 |
| 4 | 4.1 | create bug bounty report of SQL injection vulnerability and XSS vulnerability | 12 | 4 |
| | 4.2 | Detect bug and create bug bounty hunting report | 18 | 4 |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Evaluation is internal. | | |

| | |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lectures and Practical** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 25 Marks**<br>**Written Test / Seminar / Viva/ Assignments**<br>**Practical 15 Marks** |
| | **B. Semester End examination 50 Marks Time: 1.5 hours**<br>**Written test**<br>**Practical Examination 35 Marks** |

**References**

1. Bug Bounty Hunting Essentials:Quick-paced guide to help white-hat hackers get through bug bounty programs. Carlos A. Lozano Shahmeer Amir
2. Bug Bounty Bootcamp: The Guide to Finding and Reporting Web Vulnerabilities, Vickie Li
3. URL: https://www.geeksforgeeks.org/how-to-get-started-with-bug-bounty/
4. URL: https://bugbountyguide.com/

# Mahatma Gandhi University
# Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | **BSc (Hons) Cyber Forensics** | | | | | |
| **Course Name** | **REVERSE ENGINEERING AND CASE STUDIES** | | | | | |
| **Type of Course** | DCE | | | | | |
| **Course Code** | MG8DCECFS400 | | | | | |
| **Course Level** | **400 - 499** | | | | | |
| **Course Summary** | Able to analyse and understand the inner workings of software and system which is valuable in areas such as cyber security , software development and digital forensics | | | | | |
| **Semester** | VIII | Credits | | | 4 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 3 | 0 | 1 | | 75 |
| **Pre-requisites, if any** | | | | | | |

**COURSE OUTCOMES (CO)**

| **CO No.** | **Expected Course Outcomes upon completion of this course , the students will be able to:** | **Learning Domains *** | **PO No** |
|---|---|---|---|
| 1 | Understand the fundamentals of reverse engineering and its applications, learning assembly language and machine code | Understand | 1 |
| 2 | Analyzing binary files and various debugging tools and techniques to manipulate the execution of a program | Analyse | 1, 2 |
| 3 | Apply reverse engineering skills to dissect malicious software | Apply | 2 |
| 4 | Develop reverse engineering skills in real world scenarios , reinforcing theoretical knowledge | Create | 2, 3 |

***Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)***

**COURSE CONTENT**

**Content for Classroom transaction (Units)**

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Definition of Reverse Engineering, Software Reverse Engineering, Reversing Applications | 4 | 1 |
| | 1.2 | Security-Related Reversing, Reversing in Software Development, Low-Level Software | 5 | 2 |
| | 1.3 | Reversing Process, The Tools. | 6 | 3 |
| 2 | 2.1 | Program Structure: Modules, Data Management | 4 | 2 |
| | 2.2 | Control Flow High-Level Languages, | 4 | 2 |
| | 2.3 | Low-Level Data Management | 4 | 4 |
| | 2.4 | Applications Control Flow, Assembly Language. | 3 | 3 |
| 3 | 3.1 | Different Reversing Approaches, Disassemblers, Debuggers, Kernel-Mode Debuggers | 5 | 2 |
| | 3.2 | Decompilers, System-Monitoring Tools | 5 | 3 |
| | 3.3 | Patching Tools, Executable-Dumping Tools. | 5 | 3 |
| 4 | 4.1 | Reversing Malware, Types of Malwares, Uses of Malware Cracking: Piracy and Copy Protection-Software Piracy, Types of Protection. | 8 | 1 |
| | 4.2 | Advanced Protection Concepts, Crypto-Processors | 8 | 4 |
| | 4.3 | Digital Rights Management | 8 | 2 |
| | 4.4 | Watermarking, Trusted Computing & Case studies of deciphering file format | 6 | 4 |

| | | | | |
|---|---|---|---|---|
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Evaluation is internal. | | |

| | |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture and Practical** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 25 Marks**<br>**Written Test / Seminar / Viva/ Assignments**<br>**Practical 15 Marks** |
| | **B. Semester End examination 50 Marks Time: 1.5 hours**<br>**Written test**<br>**Practical Examination 35 Marks** |

**Text Books :**

1. "Practical Reverse Engineering: x86, x64, ARM, Windows Kernel, Reversing Tools, and Obfuscation" by Bruce Dang, Alexandre Gazet, and Elias Bachaalany.(Module 1)
2. "Reversing: Secrets of Reverse Engineering" by Eldad Eilam.(Module 2)
3. "The Web Application Hacker's Handbook: Finding and Exploiting Security Flaws" by Dafydd Stuttard and Marcus Pinto..(Module 3)
4. "Practical Malware Analysis: The Hands-On Guide to Dissecting Malicious Software" by Michael Sikorski and Andrew Honig. (Module 4)

**References :**

1. "Practical Reverse Engineering: x86, x64, ARM, Windows Kernel, Reversing Tools, and Obfuscation"
2. "Reversing: Secrets of Reverse Engineering" by Eldad Eilam

# Mahatma Gandhi University<br>Kottayam

|  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|
| **Programme** | **BSc (Hons) Cyber Forensics** | | | | | |
| **Course Name** | **DESIGN AND ANALYSIS OF ALGORITHM** | | | | | |
| **Type of Course** | DCE | | | | | |
| **Course Code** | MG8DCECFS401 | | | | | |
| **Course Level** | **400 - 499** | | | | | |
| **Course Summary** | Able to develop efficient solutions to computational problems encountered in various domains with a Strong foundation in algorithm design and analysis | | | | | |
| **Semester** | VIII | Credits | | | 4 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 3 | 0 | 1 | | 75 |
| **Pre-requisites, if any** | Basic knowledge of programming languages and problem-solving techniques.<br>Basic Understanding of mathematical concepts like graphs, trees, sets, and logic.<br>Some familiarity with algorithmic analysis. | | | | | |

## COURSE OUTCOMES (CO)

| CO No. | Expected Course Outcomes upon completion of this course , the students will be able to: | Learning Domains * | PO No |
|---|---|---|---|
| 1 | Familiarize core Algorithmic principles | Understand | 1,2 |
| 2 | Analyse Divide and Conquer Strategies. | Analyse | 1,2 |
| 3 | Analyse Graph Algorithms. | Analyse | 1,2 |
| 4 | Evaluate Greedy Methods and Dynamic Programming | Evaluate | 1,2 |
| ****Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)*** | | | |

**COURSE CONTENT**

**Content for Classroom transaction (Units)**

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Definition of Algorithm, Areas of algorithm study | 5 | 1 |
| | 1.2 | Performance analysis, space complexity, time complexity | 5 | 1 |
| | 1.3 | Asymptotic notations (Ore, W, q) | 5 | 1 |
| 2 | 2.1 | Divide and Conquer: General method | 5 | 2 |
| | 2.2 | Divide and Conquer: General method, Binary search, finding the maximum and minimum, merge sort, quick sort, performance measurement of quick sort, Selection, Saracen's matrix multiplication. | 5 | 2 |
| | 2.3 | Graphs Algorithms: Traversing Trees, Depth-First, Breadth-First Search, Backtracking ,8-queens problem, Best-First Search & Minimax Principle | 5 | 3 |
| 3 | 3.1 | Greedy method: General method, | 7 | 4 |
| | 3.2 | Knapsack problem, Job sequencing with deadlines, Minimal cost spanning trees, Prim's algorithm, Kruskal's algorithm, Single source shortest path, Dijkstra's Algorithm. | 8 | 4 |
| 4 | 4.1 | Dynamic programming: The general method | 12 | 4 |
| | 4.2 | Multistage graphs, all-pairs shortest path, Single source shortest path, 0/1 Knapsack problem, Traveling Sales person problem. The Principle of Optimality, Chained Matrix Multiplication. | 18 | 4 |

| | | | | |
|---|---|---|---|---|
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Evaluation is internal. | | |

| | |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture and Practical** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**E. Continuous Comprehensive Assessment (CCA) 25 Marks**<br>**Written Test / Seminar / Viva/ Assignments**<br>**Practical 15 Marks** |
| | **F. Semester End examination 50 Marks Time: 1.5 hours**<br>**Written test**<br>**Practical Examination 35 Marks** |

## REFERENCES

1. Ellis Horowitz, Sartaj Sahni, Sanguthevan Rajasekharan ,Computer algorithms/C++ (Second Edition) Universities Press.
2. Anany Levitin Introduction to design and analysis of algorithms Addison Wesley Low price edition. 3. Richard Neapolitan, Kumarss Naimipour Foundation of Algorithms using C++.
3. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, Introduction to Algorithms, MIT Press, 2009 [Modules 1,2,6]
4. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, The Design and Analysis ofComputer Algorithms, Pearson Education, 19

# Mahatma Gandhi University Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | **BSc (Hons) Cyber Forensics** | | | | | |
| **Course Name** | **DATA MINING AND BIG DATA ANALYSIS WITH TOOLS** | | | | | |
| **Type of Course** | DCE | | | | | |
| **Course Code** | MG8DCECFS402 | | | | | |
| **Course Level** | **400 – 499** | | | | | |
| **Course Summary** | Able to handle large dataset, extract valuable insights and contribute meaningfully to data-driven decision-making processes | | | | | |
| **Semester** | VIII | Credits | | | 4 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 3 | 0 | 1 | | 75 |
| **Pre-requisites, if any** | | | | | | |

**COURSE OUTCOMES (CO)**

| **CO No.** | **Expected Course Outcomes upon completion of this course , the students will be able to:** | **Learning Domains *** | **PO No** |
|---|---|---|---|
| 1 | Recognize big data and data mining techniques | Understand | 1 |
| 2 | Analyse the critical role of data quality in analysis and decision making. | Analyse | 1, 2 |
| 3 | Apply statistical concepts in Big Data analytics. | Apply | 1,2 |
| 4 | Developing problem solving abilities | Create | 1,2 |
| ***Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)*** | | | |

**COURSE CONTENT**

**Content for Classroom transaction (Units)**

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Introduction to data mining concepts. | 4 | 1 |
| | 1.2 | Evaluation of data warehouse, OLAP technology and data warehouse architecture. | 5 | 1 |
| | 1.3 | Analyse the classification and regression for predictive analysis, cluster analysis and outlier analysis. | 6 | 1 |
| 2 | 2.1 | An overview of data pre-Processing and Data Cleaning. | 5 | 2 |
| | 2.2 | Efficient and scalable method of association rule mining | 5 | 2 |
| | 2.3 | Evaluation and classification by decision tree terminologies | 5 | 2 |
| 3 | 3.1 | Understand the concepts of big data mining. | 4 | 3 |
| | 3.2 | Analyse the nature of data and processing tools. | 5 | 3 |
| | 3.3 | Evaluate the statistical concepts of sample distribution and prediction error | 6 | 3 |
| 4 | 4.1 | Understand the installation and configuration of NumPy, pandas using python. | 10 | 4 |
| | 4.2 | Analysing and implementation of machine learning tools like Hadoop & Spark. | 10 | 4 |
| | 4.3 | Evaluate the problem-solving abilities by addressing the Map-reduce framework. | 10 | 4 |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Evaluation is internal. | | |

| | |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture and Practical** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 25 Marks**<br>**Written Test / Seminar / Viva/ Assignments**<br>**Practical 15 Marks** |
| | **B. Semester End examination 50 Marks Time: 1.5 hours**<br>**Written test**<br>**Practical Examination 35 Marks** |

# Text Books :

1. Jiawei Han and Micheline Kamber – Data Mining – Concepts and Techniques, Second Edition ,Elsevier 2006.
2. Michael Berthold , David J. Hand ," Intelligent Data Analysis", Springer, 2007.
3. Michael Minelli, Michelle Chambers, and AmbigaDhiraj, "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses", Wiley, 2013.
4. Eric Sammer, "Hadoop Operations", O'Reilley, 2012.

**Reference Books**:

1. Big Data Analytics Lab Manual: Step by Step Guide to Hadoop, Pig, Hive and MongoDB **Kindle Edition** by Dr. M.S.Vijaya Dr. N.Radha V. Pream Sudha (Author), Dr. N. Radha Narayanan (Author), Mrs. V. Pream Sudha Veluswamy (Author)**.**
2. Big Data Analytics with Spark: A Practitioner's Guide to Using Spark for Large Scale Data Analysis Paperback – 14 February 2016 by Mohammed Guller (Author).

3 .MapReduce Design Patterns: Building Effective Algorithms and Analytics for Hadoop and Other Systems **Paperback – Import, 7 December 2012** by Donald Miner (Author), Adam Shook (Author).

4 Absolute Beginner's Python Programming Full Color Guide with Lab Exercises: The Illustrated Guide to Learning Computer Programming: 1 (Illustrated Coding) Paperback – Import, 5 December 2022 by Kevin Wilson (Author).

5 DATA SCIENCE WITH PYTHON : A Beginner's Guide to Python for Data Science That's Easy to Follow (2022 Crash Course for Newbies) **Paperback – 3 October 2022** by Wade Briggs (Author).

# Mahatma Gandhi University
# Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | **BSc (Hons) Cyber Forensics** | | | | | |
| **Course Name** | **RESEARCH METHODOLOGY IN CYBER FORENSICS** | | | | | |
| **Type of Course** | DCE | | | | | |
| **Course Code** | MG8DCECFS403 | | | | | |
| **Course Level** | **400 - 499** | | | | | |
| **Course Summary** | It provides students with the knowledge and skills required to conduct research effectively, choose appropriate research methodologies, and document research findings in a comprehensive dissertation. | | | | | |
| **Semester** | VIII | Credits | | | 4 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 3 | 0 | 1 | | 75 |
| **Pre-requisites, if any** | Domain knowledge, Research aptitude | | | | | |

## COURSE OUTCOMES (CO)

| CO No. | Expected Course Outcomes upon completion of this course , the students will be able to: | Learning Domains * | PO No |
|---|---|---|---|
| 1 | Understand the concepts of research and its significance in various disciplines | Understand | 1 |
| 2 | Evaluate research questions and hypotheses | Evaluate | 1,2 |
| 3 | Analyse appropriate research designs and methodologies for different types of studies | Analyse | 2,3 |
| 4 | Apply various data collection methods, statistical and qualitative analysis techniques to interpret research data | Apply | 2,3,4 ,8 |

***Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)***

## COURSE CONTENT

**Content for Classroom transaction (Units)**

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Introduction to Research Methods-<br>Motivation and Objectives of Research, Types and Approaches, Methods of Research: Theoretical and Experimental Research Process | 6 | 1 |
|  | 1.2 | Significance of Research - Methods Vs Methodology - Research Process – Components of Research Problem, Various Steps in Scientific Research, Literature Survey – Primary Data and Secondary Data. | 7 | 1 |
|  | 1.3 | Major Internet Services, Working of Internet, Downloading Super Tools for Better Computing Internet, Searching the Keywords. | 7 | 1 |
| 2 | 2.1 | Data Collection and Sampling Design-<br>Sources of Data: Primary Data, Secondary Data; Procedure Questionnaire | 5 | 2 |
|  | 2.2 | Survey and Experiments - Sampling Merits and Demerits, Sampling Errors, Processing and Analysis of Data - Statistics in Research | 6 | 2 |
|  | 2.3 | Measures of Central Tendency - Measures of Dispersion -Measures of Asymmetry (Skewness) – Error Analysis | 7 | 2 |
| 3 | 3.1 | Processing and Analysis of Data -<br>Processing Operations ,Some Problems in Processing ,Elements/Types of Analysis ,Statistics in Research, Measures of Central Tendency | 7 | 3 |
|  | 3.2 | Measures of Dispersion ,Measures of Asymmetry (Skewness) ,Measures of Relationship ,Simple Regression Analysis | 7 | 3 |
|  | 3.3 | Multiple Correlation and Regression ,Partial Correlation. | 6 | 3 |
| 4 | 4.1 | Sampling Fundamentals<br>Need for Sampling ,Some Fundamental Definitions | 6 | 4 |

|  |  |  |  |  |
|---|---|---|---|---|
|  | 4.2 | Important Sampling Distributions ,Central Limit Theorem Sampling Theory | 6 | 4 |
|  | 4.3 | Sandler's A-test, Concept of Standard Error ,Estimation | 5 | 4 |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Evaluation is internal. |  |  |

|  |  |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture and Practical** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 25 Marks**<br>**Written Test / Seminar / Viva/ Assignments**<br>**Practical 15 Marks** |
|  | **B. Semester End examination 50 Marks Time: 1.5 hours**<br>**Written test**<br>**Practical Examination 35 Marks** |

**Books for References**

1. C.R. Kothari, Research Methodology Methods and Techniques, 2/e, Vishwa Prakashan, 2006
2. Bendat and Piersol, Random Data: Analysis and Measurement Procedures, Wiley Interscience, 2001.
3. Shumway and Stoffer, Time Series Analysis and Its Applications, Springer, 2000.
4. Jenkins, G.M., and Watts, D.G., Spectral Analysis and Its Applications, Holden Day, 1986
5. S.C.Gupta and V. K. Kapoor, Fundamentals of Mathematical Statistics,11th Edition-2002
6. Donald H. McBurney, Research Methods, 5th Edition, Thomson Learning, ISBN: 81-315-0047-0, 2006.
7. Helmet Kopka and Patrick.W.Daly, "A Guide to Latex and Electronic", 4th Edition – Addison- Wesly Longman Limited, 2004 (Section 3.1-3.4, 4.1,4.2,4.5,4.8, 5.1, 5.3 and 9.3)
8. Section Amos Gilat, MATLAB, An Introduction with Applications, John Wiley & Sons, 2004. (Chapters 8 and 9)
9. Leslie Lamport, LaTeX: A Document Preparation System, Addison Wesley, ISBN-13: 978-0201529838, 1994

# Mahatma Gandhi University Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | **BSc (Hons) Cyber Forensics** | | | | | |
| **Course Name** | **PUBLICATION ETHICS AND DOCUMENTATION STANDARDS** | | | | | |
| **Type of Course** | DCE | | | | | |
| **Course Code** | MG8DCECFS404 | | | | | |
| **Course Level** | **400 -499** | | | | | |
| **Course Summary** | **This syllabus aim to encompass a range of skills, knowledge, and ethical awareness necessary for students to navigate the complex landscape of cyber forensics with integrity and professionalism.** | | | | | |
| **Semester** | VIII | Credits | | | 4 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 3 | 0 | 1 | | 75 |
| **Pre-requisites, if any** | | | | | | |

**COURSE OUTCOMES (CO)**

| CO No. | Expected Course Outcomes upon completion of this course , the students will be able to: | Learning Domains * | PO No |
|---|---|---|---|
| 1 | Understand the legal and ethical considerations in creating and maintaining documentation | Understand | 1 |
| 2 | Analyse the ethical challenges in real-world cyber forensics cases . | Analyse | 4,6 |
| 3 | Evaluate authorship guidelines ,tools and techniques for detecting plagiarism in cyber forensics research | Evaluate | 6,8,9 |
| 4 | Applying ethical principles to hypothetical cyber forensics | Apply | 6,8 |

****Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)***

**COURSE CONTENT**

**Content for Classroom transaction (Units)**

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | **Introduction to Publication Ethics in Cyber Forensics**: Overview of cyber forensics and its role in investigations | 4 | 1 |
| | 1.2 | Ethical considerations unique to cyber forensics research, Historical cases of ethical misconduct in cyber forensics | 5 | 1 |
| | 1.3 | **Responsible Authorship in Cyber Forensics**: Authorship guidelines in cyber forensics publications, Collaborative research and authorship attribution, Case studies on authorship disputes in cyber forensics | 6 | 3 |
| 2 | 2.1 | **Plagiarism and Academic Integrity in Cyber Forensics**: Types of plagiarism in the context of cyber forensics , Academic integrity challenges in digital investigations | 4 | 1 |
| | 2.2 | Tools and techniques for detecting plagiarism in cyber forensics research | 5 | 3 |
| | 2.3 | **Peer Review Process in Cyber Forensics** : Importance of peer review in cyber forensics publications , Ethical challenges in reviewing digital evidence , Ensuring objectivity and fairness in cyber forensics peer review , Simulated peer review exercises | 6 | 3,4 |
| 3 | 3.1 | **Data Integrity and Management in Cyber Forensics** : Data integrity challenges in digital forensics , Techniques for ensuring the integrity of digital evidence | 4 | 1 |
| | 3.2 | Ethical considerations in the handling and storage of digital data , Digital evidence preservation and chain of custody | 5 | 1 |
| | 3.3 | **Ethical Issues in Cyber Forensics Publishing** : Conflicts of interest in cyber forensics research , Ethical considerations in analyzing and | 6 | 1,3 |

| | | | | |
|---|---|---|---|---|
| | | reporting cyber threats , Balancing the need for transparency with security concerns , Addressing ethical challenges in international cyber investigations | | |
| 4 | 4.1 | **Documentation Standards in Cyber Forensics** : Citation styles and referencing in digital investigations , Documenting and reporting cyber forensics methodologies , Standard operating procedures for cyber forensics documentation , Legal and ethical considerations in creating and maintaining documentation | 15 | 1 |
| | 4.2 | **Emerging Issues and Future Trends in Cyber Forensics** : Ethical implications of emerging technologies in cyber forensics , Evolving standards for digital investigations | 8 | 1,2 |
| | 4.3 | Cybersecurity and ethical responsibilities , Final reflections on ethical considerations in cyber forensics | 7 | 4 |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Valuation is internal. | | |

| | |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecture and Practical** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 25 Marks**<br>**Written Test / Seminar / Viva/ Assignments**<br>**Practical 15 Marks** |
| | **B. Semester End examination 50 Marks Time: 1.5 hours**<br>**Written test**<br>**Practical Examination 35 Marks** |

**References :**

1 "Ethics in Information Technology" by George Reynolds

2. "Writing and Publishing Science Research Papers in English: A Global Perspective" by Karen Englander
3. "Plagiarism, Intellectual Property and the Teaching of L2 Writing" by Joel Bloch
4. Peer Review and Manuscript Management in Scientific Journals: Guidelines for Good Practice" by Irene Hames
5. Digital Forensics: Principles and Practices" by Natarajan Meghanathan, et al.
6. Digital Evidence and Computer Crime: Forensic Science, Computers and the Internet" by Eoghan Casey

# Mahatma Gandhi University
# Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | **BSc (Hons) Cyber Forensics** | | | | | |
| **Course Name** | **STATISTICAL ANALYSIS OF RESEARCH DATA AND TOOLS** | | | | | |
| **Type of Course** | DCE | | | | | |
| **Course Code** | MG8DCECFS405 | | | | | |
| **Course Level** | **400 - 499** | | | | | |
| **Course Summary** | This course is designed to equip students with the necessary skills to analyze and interpret data collected in the field of cyber forensics. It integrates statistical methods with practical tools commonly used in digital investigations. | | | | | |
| **Semester** | VIII | Credits | | | 4 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 3 | 0 | 1 | 0 | 75 |
| **Pre-requisites, if any** | | | | | | |

## COURSE OUTCOMES (CO)

| **CO No.** | **Expected Course Outcomes upon completion of this course , the students will be able to:** | **Learning Domains *** | **PO No** |
|---|---|---|---|
| 1 | Understand the principles of hypothesis testing. | Understand | 1 |
| 2 | Examine the relationships between variables using regression analysis techniques | Analyse | 1 |
| 3 | Apply statistical techniques to make informed decisions. | Apply | 2 |
| 4 | Implement Probability distributions in cyber forensics | Apply | 2 |
| ***Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)** | | | |

## COURSE CONTENT

**Content for Classroom transaction (Units)**

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | Reasons to Study Statistics, The Nature and Role of Variability. | 3 | 1 |
|  | 1.2 | Statistics and the Data Analysis Process. | 4 | 2 |
|  | 1.3 | Types of Data | 4 | 1 |
|  | 1.4 | Collecting Data Sensibly: Sampling | 4 | 2 |
| 2 | 2.1 | Numerical Methods for Describing Data :<br>Describing the Center of a Data Set | 2 | 1 |
|  | 2.2 | Describing Variability in a Data Set) | 2 | 1 |
|  | 2.3 | Summarizing Bivariate Data: Correlation, Linear Regression | 2 | 2 |
|  | 2.4 | Assessing the Fit of a Line | 4 | 3 |
|  | 2.5 | Nonlinear Relationships and Transformations | 3 | 4 |
|  | 2.6 | Logistic Regression | 2 | 4 |
| 3 | 3.1 | Definition of Probability, Basic Properties of Probability, Conditional Probability | 4 | 1 |
|  | 3.2 | Random Variables and Probability Distributions. Random Variables, Probability Distributions for Discrete Random Variables. | 4 | 3 |
|  | 3.3 | Probability Distributions for Continuous Random Variables | 4 | 3 |
|  | 3.4 | Mean and Standard Deviation of a Random Variable | 2 | 4 |
| 4 | 4.1 | Hypotheses and Test Procedures. | 8 | 4 |

|  |  |  |  |  |
|---|---|---|---|---|
|  | 4.2 | Errors in Hypotheses Testing | 5 | 1 |
|  | 4.3 | Multiple Regression | 8 | 4 |
|  | 4.4 | Analysis of Variance: Single-Factor ANOVA and the F Test. | 9 | 4 |
| 5 | 5.1 | Teacher Specific content. This can be either class room teaching, practical session, field visit etc as specified by the teacher concerned.<br>Evaluation is internal. |  |  |

|  |  |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**Lecturer and practical** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 25 Marks**<br>**Written Test / Seminar / Viva/ Assignments**<br>**Practical 15 Marks** |
|  | **B. Semester End examination 50 Marks**<br>**Written test ..Time -1.5 hours**<br>**Practical Examination 35 Marks** |

## TEXT BOOKS:

1. Introduction to Statistics and Data Analysis by Roxy Peck, Chris Olsen, Jay Devore, Third Edition, Thomson .

## REFERENCES:

1. "Statistics for Business and Economics" by Paul Newbold, William L. Carlson, and Betty Thorne, Pearson, Eighth edition.
2. Data Science for Business: What You Need to Know about Data Mining and Data-Analytic Thinking ,1st Edition, Kindle Edition.
3. Journal articles, research papers, and online resources related to statistical analysis in cyber forensics.

# Mahatma Gandhi University
# Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | **BSc (Hons) Cyber Forensics** | | | | | |
| **Course Name** | **INTERNSHIP** | | | | | |
| **Type of Course** | INT | | | | | |
| **Course Code** | MG4INTCFS200 | | | | | |
| **Course Level** | **200 -299** | | | | | |
| **Course Summary** | **A key aspect of the new MGU UGP programme is induction into actual work situations. All Students will undergo internships in a firm, industry, or organization or training in labs with faculty and researchers in their own or other institutions during the summer vacation.** | | | | | |
| **Semester** | IV | Credits | | | 2 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | | | | | |
| **Pre-requisites, if any** | Basic knowledge of programming and understanding of computer science concepts. | | | | | |

**COURSE OUTCOMES (CO)**

| CO No. | Expected Course Outcomes upon completion of this course , the students will be able to: | Learning Domains * | PO No |
|---|---|---|---|
| 1 | Apply technical knowledge effectively to assigned tasks and projects | An,A,S | 1 |
| 2 | Demonstrate critical thinking and problem-solving skills in various situations | C,S,E | 2 |
| 3 | Communicates clearly and effectively, both verbally and in writing | An,A,Ap | 2 |
| | | | |
| ****Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)*** | | | |

## COURSE CONTENT

### Content for Classroom transaction (Units)

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | All Students will undergo internship in a firm, industry, or organization or training in labs with faculty and researchers in their own or other institutions during the summer vacation. | | |

| | |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)**<br>**· No class room activity. Done During Vacation**<br>**· Discussions**<br>**· Self-learning and Development** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 15 Marks**<br>***1. Review 1***<br>***2. Review 2*** |
| | **B. Semester End examination 35 Marks**<br>**1. Project Presentation -15**<br>**2. Viva - 10**<br>**3. Report - 10** |

# Mahatma Gandhi University
# Kottayam

| | | | | | | |
|---|---|---|---|---|---|---|
| **Programme** | **BSc (Hons) Cyber Forensics** | | | | | |
| **Course Name** | **PROJECT** | | | | | |
| **Type of Course** | PRJ | | | | | |
| **Course Code** | **MG8PRJCFS400** | | | | | |
| **Course Level** | **400 - 499** | | | | | |
| **Course Summary** | The aim of the project is to test the independent research skills students have acquired during their time at University/College. | | | | | |
| **Semester** | VIII | Credits | | | 12 | Total Hours |
| **Course Details** | Learning Approach | Lecture | Tutorial | Practical | Others | |
| | | 0 | 0 | 12 | | |
| **Pre-requisites, if any** | | | | | | |

**COURSE OUTCOMES (CO)**

| CO No. | Expected Course Outcomes upon completion of this course , the students will be able to: | Learning Domains * | PO No |
|---|---|---|---|
| 1 | Design research problem and align research objective | Apply | 1,2,3,8 |
| 2 | Demonstrate skills in literature review, data collection, analysis, interpretation, and reporting. | Apply | 1,2,3 |
| 3 | Appraise research design, methods and experiments used. | Apply | 1,2,3 |
| 4 | Interpret the findings in relation to research objective | Apply | 1,2,3 |
| 5 | Communicates clearly and effectively, both verbally, visually and in writing | Apply | 1,2,3,4 |
| ***Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)*** | | | |

## COURSE CONTENT

### Content for Classroom transaction (Units)

| Module | Units | Course description | Hrs | CO No. |
|---|---|---|---|---|
| 1 | 1.1 | The students who want to graduate as BSc (Honours with Research) are required to complete the Research Project in the eighth semester. Research Project must be done under the guidance of an eligible faculty. | 3 | 1 |

| | |
|---|---|
| **Teaching and Learning Approach** | **Classroom Procedure (Mode of transaction)** |
| **Assessment Types** | **MODE OF ASSESSMENT**<br>**A. Continuous Comprehensive Assessment (CCA) 60 Marks**<br>**i. Review 1: Problem statement (CO1)– (10 marks)**<br>**ii. Review 2: Literature Review, Gap Analysis, Research Objectives (CO2) -(10 marks)**<br>**iii. Review 3 (CO3): Methodology and Design- (20 marks)**<br>**iv. Review 4 (CO4 & CO5): (20 marks)**<br>**a) Experiments and Results**<br>**b) Presentation and Viva Voce** |
| | **B. Semester End examination 140 Marks**<br>**i. Problem statement (CO1): 10 marks**<br>**ii. Literature Review, Gap Analysis, Research Objectives – (CO2): 30 marks**<br>**iii. Methodology and Design (CO3): 30 marks**<br>**iv. Experiments and Results (CO4): 30 marks**<br>**v. Thesis Presentation and Viva Voce (CO5): 25 marks**<br>**vi. Publication (CO5):15 marks** |

**MGU FYUGP -5 Day Workshop**

**13.11.2023 - 17.11.2023**

**Name of the Programme: CYBER FORENSICS**

**Chairperson/Convenor of BOS/ Expert Committee: Dr. Kurian M.J.**

**Venue of the Programme: NESTT Muvattupuzha/Nirmala College Muvattupuzha**

| Sl.No | Name of the Participant | Designation | Department | College Address |
|---|---|---|---|---|
| 1 | Syama P.S. | Asst. Professor | Computer Science | STAS, Edappally |
| 2 | Thirumeni K. R. | Asst. Professor | Computer Science | STAS, Edappally |
| 3 | Binitha Raju | Asst. Professor | Computer Science | ILM College |
| 4 | Lintu Sara Jose | Asst. Professor | Computer Science | IGCAS ,Nellikuzhy |
| 5 | Sasikala S | Asst. Professor | Computer Science | STAS, Edappally |
| 6 | Rajasree G. | Asst. Professor | Computer Science | STAS, Pathanamthitta |
| 7 | Ann V Easow | Asst. Professor | Computer Science | STAS, Pathanamthitta |
| 8 | Abdul Muhammed Rasheed | Asst. Professor | Computer Science | STAS, Pathanamthitta |
| 9 | Rema K. | Asst. Professor | Computer Science | STAS, Pathanamthitta |
| 10 | Jiji J. | Asst. Professor | Computer Science | Viswabrahmana College , Vechoochira |
| 11 | Anuja  Ghosh M.A. | Asst. Professor | Computer Science | KMM College Arts & Science Thrikkakara |
| 12 | Navya Vijayan N. | Asst. Professor | Computer Science | STAS, Pathanamthitta |
| 13 | Rabeena P.A. | Asst. Professor | Computer Science | Cochin Arts and Science College, Manakkakadavu |
| 14 | Capt. Jobin varghese P. | Asst. Professor | Computer Science | K.E. College Mannanam |
| 15 | Renjana Ramachandran | Asst. Professor | Computer Science | STAS, Pathanamthitta |
| 16 | Nibin Babu | Asst. Professor | Computer Science | SNGCAS, paingattoor |
| 17 | Divya S. | Asst. Professor | Computer Science | STAS, Edappally |
| 18 | Jisha Mary George | Asst. Professor | Computer Science | STAS, Kottayam |
| 19 | Manju G. R. | Asst. Professor | Computer Science | STAS, Kottayam |
| 20 | Shalini V. | Asst. Professor | Computer Science | Siena College of Professional Studies ,Edakochi |
| 21 | Anit Benjamin | Asst. Professor | Computer Science | STAS, Kottayam |
| 22 | Dr. Kurian M.J | Professor | Computer Applications | Baselios Poulose II Catholicos College Piravom |