Digital Forensics

Objectives

Upon Completion of this course the student will be able to:

1 Perform the steps included in a digital investigation from the initial recognition of an incident through the steps of evidence gathering, preservation and analysis, and the completion of legal proceedings;

2 Identify important file metadata and apply their use in a forensic investigation;

3 Perform a forensic investigation on a forensic image, using various tools to recover evidence, resulting in a report documenting the investigation;

4 Write professional quality reports that include both a summary report.

Digital Forensic: Cycle III

Course Developed

by

Uttarakhand Open University, Haldwani

With support

of

Commonwealth Educational Media Centre for Asia,

New Delhi

COURSE CONTENTS

COURSE DESCRIPTION

Computer forensics, or digital forensics, is a fairly new field. Computer forensics investigators, also known as computer forensics specialists, computer forensics examiners, or computer forensics analysts, are charged with uncovering and describing the information contained on, or the state or existence of, a digital artifact. Digital artifacts include computer systems, hard drives, CDs, and other storage devices, as well as electronic documents and files like emails and JPEG images. The fast-growing field of computer forensics includes several branches related to firewalls, networks, databases, and mobile devices. Digital forensics technicians can find work with many types of organizations: government (local, state, and federal), accounting firms, law firms, banks, and software development companies. Essentially, any kind of organization that has a computer system may have a need for a digital forensics specialist. Some digital forensics specialists opt to start their own businesses, giving them an opportunity to work with a variety of clients. Computer forensics investigators provide many services based on gathering digital information, from investigating computer systems and data in order to present information for legal cases to determining how an unauthorized user hacked into a system. A digital forensics examiner does many things in the course of these tasks – protects the computer system, recovers files (including those that were deleted or encrypted), analyses data found on various disks, and provides reports, feedback, and even testimony when required. The employment outlook for digital forensics examiners and investigators is favorable due to the rapid growth of crimes involving computers (cybercrime).

LEARNING OUTCOMES

After the successful completion of this course, the learner will be able to:

A. Understand the importance of a systematic procedure for investigation of data found on digital storage media that might provide evidence of wrong-doing.
B. Understand the file system storage mechanisms of the operating systems.
C. Use tools for faithful preservation of data on disks for analysis.
D. Find data that may be clear or hidden on a computer disk.
E. Learn the use of computer forensics tools used in data analysis, such as searching, absolute disk sector viewing and editing, recovery of files, password cracking, etc.
F. Understand how to present the results of disk data analysis in a court proceeding as an expert witness.

CERTIFICATE

A completion certificate issued jointly by UOU and CEMCA will be available based on your level of participation and completion of tasks/activities: requires 60% on each quiz and participation in discussion forum.

DURATION AND MEDIUM

It's a 4 Weeks course which is offered in English.

INSTRUCTORS

Dr. Akashdeep Bharadwaj, Professor, University of Petroleum and Energy Studies, Dehradun	Dr. Jeetendra Pande, Associate Professor-Comp. Sc. & Dy. Director, Online Program Cell, Uttarkhand Open University, Haldwani
Gp. Cap.(Er) Ashok Kumar, Indian Air Force, New Delhi	Dr. Sangram Panigrahi, Assistant Professor-Computer Science, Siksha 'O' Anusandhan, Deemed to be University, Bhubaneswar-751030, Odisha, India
Mr. Rishikesh Ojha, Team Lead-eDiscovery, UnitedLex Corporation, USA	Mr. Sridhar Chandrmohan Iyer, Assistant Professor- Computer Science, Universal College of Engineering, Vasai, Maharashtra

COURSE DESIGNER AND COORDINATOR

Dr. Jeetendra Pande
Associate Professor- Computer Science,
School of Computer Science & IT
Uttarakhand Open University, Haldwani E-mail: jpande@uou.ac.in

ORIENTATION OF THE MENTORS AND THE INSTRUCTORS

An online orientation session for all the instructors and the mentors was conducted on 24 December, 2021 at 11:00 am. All the course mentors attended the orientation program. Dr. Jeetendra Pande, the course coordinator of the online training program briefed about the UOU's MOODLE based LMS through which the course is offered. He also informed that four online live discussion sessions are also planned on weekends. The experts advised to conduct the live session at evening hours keeping the engagement of the participants in the day hours. The login credentials were shared with the experts and mentors via email.

DETAILS ABOUT THE COURSES

UOU offered 4-week online training program from *24 December, 2021 to 23 January, 2022* through MOODLE platform. Course materials were designed and developed by Dr. Jeetendra Pande, Associate Professor- Computer Science, Uttarakhand Open University and his team. The content includes video lectures, power point presentation, transcripts, etc. were uploaded and placed in the sequential manner and provided navigation for easy access. Details about the course are given below:

Courses	Start Date	End Dates	No of Modules	No of Instructors
Digital Forensics	22-11-2021	20-12-2021	20	6

Participants Registration and Participation

Initially, UOU announces the courses details in the University website, Social Media platforms like Facebook, Linkedin, etc. and invited the participants for registration through google form. Total 897 participants registered for the online training program on Digital Forensics. To facilitate the registration on the course portal, the organizers created the login for the participants and the credentials were sent to them along with instruction through registered email. Out of total 897 applications, 512 participants registered for the course on the course portal. 385 participants never logged in to the portal after registration. So, there were 512 participants who registered for the course and logged in to the course portal for at least once.

Gender

It is evident that out of 636 participants, 499(78%) were male and 137(22%) were female. This reveals that more male participants registered in the course as compared to the female participants.
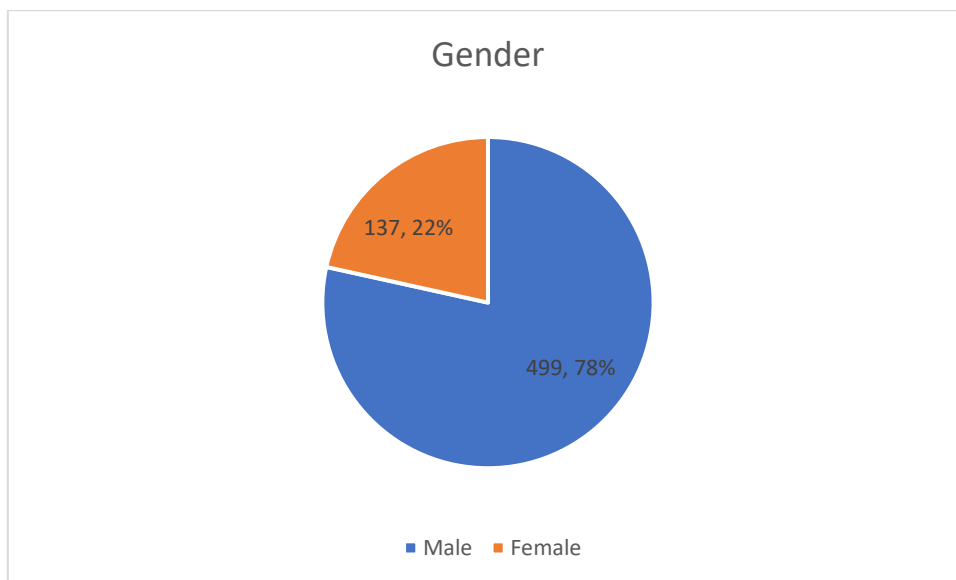

FIGURE 1: SHOWS PERCENTAGE OF MALE AND FEMALE PARTICIPANTS

MONITORING THE PROGRESS OF PARTICIPANTS USING LOG REPORT OF MOODLE

Log Report of MOODLE shows activity within the course. It allows teachers to see what course material and activity are being used and when by the participants. For example, a teacher can check that an individual participant has viewed the course material for that week or topic they declare to have read, and how long. This helps the teacher to monitor the participants and motivate them to take part in the course. The log reports of the 4-week online training program on Digital Forensics offered by the UOU and CEMCA have analyzed and the data are given in the following sections.

Learning Objectives viewed by the Participants

Learning objectives are statements which describe the expected outcome of a curriculum, course, lesson or activity in terms of demonstrable skills or knowledge that will be acquired by the participants after completing the course. The figure shows that the number of participants accessed the learning objectives of the online training program which was listed under the Announcement. There is total 136 views by 49 users. It is important that the participants should view the learning objectives to know the outcomes of the course.

Announcements	136 views by 49 users	-	Tuesday, 25 January 2022, 12:00 PM (1 day 4 hours)
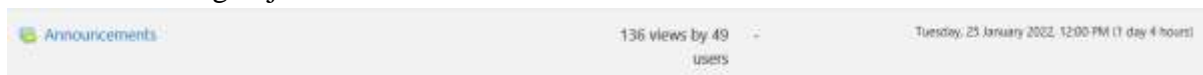
Course materials viewed by the participants

Course materials are most essential component for online courses. Participants learn from this content to enrich themselves. The content should be interesting as the teacher is away from them. Since the course access through devices, the content should be enriching with multimedia component to retain the attention of the participants. This course has 20 modules arranged in 84 topics and has videos, pdf of transcript and ppt files for content. The participants have accessed the content to learn the course. The first module of the online training program is "Introduction to Digital Forensics" and the instructor for this module is Dr. Jeetendra Pande, Associate Professor- Computer Science, Uttarakhand Open University, Haldwani. The details of the total views of the video lecture by the users is given below.

Introduction to Digital Forensics			
Definition of Computer Forensics	162 views by 67 users	-	Wednesday, 26 January 2022, 7:56 AM (8 hours 44 mins)
Cyber Crime	76 views by 53 users	-	Wednesday, 26 January 2022, 7:56 AM (8 hours 44 mins)
Evolution of Computer Forensics	58 views by 47 users	-	Wednesday, 26 January 2022, 7:59 AM (8 hours 44 mins)
Objectives of Computer Forensics	50 views by 40 users	-	Wednesday, 26 January 2022, 7:56 AM (8 hours 44 mins)
Roles of Forensics Investigator	53 views by 42 users	-	Wednesday, 26 January 2022, 7:58 AM (8 hours 44 mins)
Forensics Readiness	56 views by 42 users	-	Wednesday, 26 January 2022, 7:59 AM (8 hours 44 mins)
Steps for Forensics	50 views by 42 users	-	Wednesday, 26 January 2022, 7:56 AM (8 hours 44 mins)
Introduction to Digital Forensics(e-text)	70 views by 46 users	-	Wednesday, 26 January 2022, 8:01 AM (8 hours 42 mins)

The second module is "Computer Forensics Investigation Process" and the instructor for this module is Dr. Jeetendra Pande, Associate Professor- Computer Science, Uttarakhand Open University, Haldwani. There is total 5 video lectures and 1 e-text file in this module. The details of the total views of the video lecture by the users is given below.

Computer Forensics Investigation Process			
Computer Forensics Investigation Process	41 views by 38 users	–	Wednesday, 26 January 2022, 7:59 AM (8 hours 44 mins)
Computer Forensics Investigation Process-Assessment Phase	41 views by 37 users	–	Wednesday, 26 January 2022, 7:59 AM (8 hours 44 mins)
Acquire the Data	42 views by 37 users	–	Wednesday, 26 January 2022, 10:21 AM (6 hours 21 mins)
Analyze the Data	41 views by 36 users	–	Wednesday, 26 January 2022, 10:21 AM (6 hours 22 mins)
Report the Investigation	41 views by 38 users	–	Wednesday, 26 January 2022, 10:21 AM (6 hours 22 mins)
Computer Forensics Investigation Process(e-text)	54 views by 39 users	–	Wednesday, 26 January 2022, 8:01 AM (8 hours 42 mins)

The third module is "Digital Evidence and First Responder Procedure" and the instructor for this module is Dr. Jeetendra Pande, Associate Professor- Computer Science, Uttarakhand Open University, Haldwani. There is total 4 video lectures and 1 e-text file in this module. The details of the total views of the video lecture by the users is given below.

Digital Evidence and First Responder Procedure			
Digital Evidence	44 views by 37 users	–	Wednesday, 26 January 2022, 8:00 AM (8 hours 43 mins)
Digital Evidence Investigation Process	40 views by 36 users	–	Wednesday, 26 January 2022, 8:00 AM (8 hours 43 mins)
First Responders Toolkit	41 views by 36 users	–	Wednesday, 26 January 2022, 8:00 AM (8 hours 43 mins)
Issues Facing Computer Forensics	37 views by 35 users	–	Wednesday, 26 January 2022, 8:00 AM (8 hours 43 mins)
Digital Evidence and First Responder Procedure(e-text)	45 views by 34 users	–	Wednesday, 26 January 2022, 8:01 AM (8 hours 42 mins)

The fourth module is "Types of Investigation" and the instructor for this module is Dr. Jeetendra Pande, Associate Professor- Computer Science, Uttarakhand Open University, Haldwani. There is total 2 video lectures and 1 e-text file in this module. The details of the total views of the video lecture by the users is given below.

Types of Investigation			
Types of Investigation	41 views by 35 users	–	Wednesday, 26 January 2022, 8:00 AM (8 hours 43 mins)
Techniques in digital forensics	36 views by 35 users	–	Wednesday, 26 January 2022, 8:00 AM (8 hours 43 mins)
Types of Investigation(e-text)	47 views by 35 users	–	Wednesday, 26 January 2022, 8:02 AM (8 hours 41 mins)

The fifth module is "Understanding Storage Media" and the instructor for this module is Dr. Jeetendra Pande, Associate Professor- Computer Science, Uttarakhand Open University, Haldwani. There is total 4 video lectures and 1 e-text file in this module. The details of the total views of the video lecture by the users is given below.

Understanding Storage Media			
The Booting Process	42 views by 36 users	-	Wednesday, 26 January 2022, 8:00 AM (8 hours 43 mins)
LINUX Boot Process	34 views by 32 users	-	Wednesday, 26 January 2022, 8:02 AM (8 hours 41 mins)
Mac OS Boot Sequence	34 views by 32 users	-	Wednesday, 26 January 2022, 8:02 AM (8 hours 41 mins)
Windows 10 Booting Sequence	34 views by 32 users	-	Wednesday, 26 January 2022, 8:02 AM (8 hours 41 mins)
Understanding Storage Media(e-text)	49 views by 38 users	-	Wednesday, 26 January 2022, 8:02 AM (8 hours 41 mins)
Link for First Live Session: 27 Nov., 2021 at 06:00 PM	15 views by 11 users	-	Wednesday, 5 January 2022, 12:41 AM (21 days 16 hours)
Youtube Link for Live Session	10 views by 9 users	-	Monday, 3 January 2022, 10:57 AM (23 days 5 hours)

The sixth module is "Understanding File System" and the instructor for this module is Dr. Jeetendra Pande, Associate Professor- Computer Science, Uttarakhand Open University, Haldwani. There is total 2 video lectures and 1 e-text file in this module. The details of the total views of the video lecture by the users is given below.

Understanding File System			
File System	36 views by 28 users	-	Tuesday, 25 January 2022, 11:25 PM (17 hours 18 mins)
Type of File Systems	32 views by 28 users	-	Tuesday, 25 January 2022, 11:25 PM (17 hours 18 mins)
Understanding File System(e-text)	38 views by 30 users	-	Tuesday, 25 January 2022, 11:25 PM (17 hours 18 mins)

The seventh module is "Windows Forensics" and the instructor for this module are Dr. Ajay Prasad, Sr. Astt Professor, University of Petroleum and Energy Studies, Dehradun and Mr. Sridhar Chandramohan Iyer, Assistant Professor, Universal College of Engineering, Mumbai. There is total 11 video lectures and 1 e-text file in this module. The details of the total views of the video lecture by the users is given below.

Windows Forensics			
Introduction to Windows Forensics	35 views by 28 users	-	Tuesday, 25 January 2022, 11:25 PM (17 hours 18 mins)
Windows Forensics Volatile Information	33 views by 27 users	-	Tuesday, 25 January 2022, 11:25 PM (17 hours 18 mins)
Windows Forensics Non- Volatile Information	30 views by 28 users	-	Tuesday, 25 January 2022, 11:25 PM (17 hours 17 mins)

Recovering deleted files and partitions	29 views by 27 users	–	Tuesday, 25 January 2022, 11:26 PM (17 hours 17 mins)
Windows Forensics Summary	25 views by 24 users	–	Tuesday, 25 January 2022, 11:26 PM (17 hours 17 mins)
Digital Forensics Road map: Static Data Acquisition from windows using FTK Imager	27 views by 21 users	–	Tuesday, 25 January 2022, 11:14 PM (17 hours 29 mins)
Live Data Acquisition using FTK Imager	27 views by 22 users	–	Tuesday, 25 January 2022, 11:14 PM (17 hours 29 mins)
FTK Imager	31 views by 22 users	–	Tuesday, 25 January 2022, 11:14 PM (17 hours 29 mins)
Installation of KALI Linux	25 views by 21 users	–	Tuesday, 25 January 2022, 11:14 PM (17 hours 29 mins)
RAM Dump Analysis using Volatility	25 views by 21 users	–	Tuesday, 25 January 2022, 11:14 PM (17 hours 28 mins)
Static Data Acquisition from Linux OS	23 views by 21 users	–	Tuesday, 25 January 2022, 11:14 PM (17 hours 28 mins)
Windows Forensics(e-text)	28 views by 23 users	–	Tuesday, 25 January 2022, 11:14 PM (17 hours 28 mins)

The eighth module is "Recovering Deleted Files and Partitions" and the instructor for this module are Dr. Akashdeep Bharadwaj, Professor, University of Petroleum and Energy Studies, Dehradun, Mr. Sridhar Chandramohan Iyer, Assistant Professor, Universal College of Engineering, Mumbai and Mr. Rishikesh Ojha, Forensics Expert from Industry. There is total 6 video lectures and 1 e-text file in this module. The details of the total views of the video lecture by the users is given below.

Recovering Deleted Files and Partitions

Recovering Deleted Files and Partitions	26 views by 22 users	–	Tuesday, 25 January 2022, 11:15 PM (17 hours 28 mins)
Windows Forensics Summary	26 views by 21 users	–	Tuesday, 25 January 2022, 11:15 PM (17 hours 28 mins)
Digital Forensics Tools	35 views by 21 users	–	Tuesday, 25 January 2022, 11:15 PM (17 hours 28 mins)
Overview of EnCase Forensics	23 views by 22 users	–	Tuesday, 25 January 2022, 11:15 PM (17 hours 28 mins)
Deep Information Gathering Tool: Dmitry	24 views by 23 users	–	Tuesday, 25 January 2022, 11:15 PM (17 hours 28 mins)
Computer Forensics Live Practical by using Autopsy and FTK Imager	24 views by 22 users	–	Tuesday, 25 January 2022, 11:15 PM (17 hours 28 mins)
Recovering Deleted Files and Partitions(e-text)	32 views by 25 users	–	Tuesday, 25 January 2022, 11:15 PM (17 hours 28 mins)

The nineth module is "Network Forensics" and the instructor for this module is Dr. Ajay Prasad, Sr. Astt. Professor, University of Petroleum and Energy Studies, Dehradun. Some of the videos (The Difference Between Hubs, Bridges, Switches and Gateways; 7 Layers of OSI Model), which are available under Creative Commons Licenses, are adopted from Youtube. There is total 6 video lectures and 1 e-text file in this module. The details of the total views of the video lecture by the users is given below.

Network Forensics

Introduction to Network Forensics	25 views by 22 users	-	Tuesday, 25 January 2022, 11:15 PM (17 hours 28 mins)
Network Components and their forensic importance	22 views by 22 users	-	Tuesday, 25 January 2022, 11:15 PM (17 hours 28 mins)
The Difference Between Hubs, Bridges, Switches and Gateways (Backbones)	22 views by 22 users	-	Tuesday, 25 January 2022, 11:15 PM (17 hours 28 mins)
7 Layers of OSI Model	31 views by 22 users	-	Tuesday, 25 January 2022, 11:15 PM (17 hours 28 mins)
OSI Internet Layers and their Forensic importance	22 views by 22 users	-	Tuesday, 25 January 2022, 11:15 PM (17 hours 28 mins)
Tools Introduction Wireshark and TCPDUMP	23 views by 21 users	-	Tuesday, 25 January 2022, 11:15 PM (17 hours 27 mins)
Network forensics(e-text)	34 views by 25 users	-	Tuesday, 25 January 2022, 11:15 PM (17 hours 27 mins)
ZOOM Link for Live Discussion on 11 Jan., 2022 at 06.00 PM	14 views by 12 users	-	Tuesday, 25 January 2022, 11:16 PM (17 hours 27 mins)

The tenth module is "Network Log Analysis and Forensic Tools" and the instructor for this module is Mr. Sridhar Chandramohan Iyer, Assistant Professor, Universal College of Engineering, Mumbai. There is total 5 video lectures and 1 e-text file in this module. The details of the total views of the video lecture by the users is given below.

Network Log Analysis and Forensics Tools

Packet Sniffing and Analysis using Ettercap and Wireshark	30 views by 25 users	-	Tuesday, 25 January 2022, 11:32 PM (17 hours 11 mins)
Network Forensics	27 views by 24 users	-	Tuesday, 25 January 2022, 11:32 PM (17 hours 11 mins)
Wireshark Packet Analyzer	28 views by 23 users	-	Tuesday, 25 January 2022, 11:32 PM (17 hours 11 mins)
Packet Capture using TCP DUMP	29 views by 23 users	-	Tuesday, 25 January 2022, 11:32 PM (17 hours 10 mins)
Website Penetration: WHOIS, nslookup	28 views by 24 users	-	Tuesday, 25 January 2022, 11:32 PM (17 hours 10 mins)
Network Log Analysis and Forensics Tools	34 views by 26 users	-	Tuesday, 25 January 2022, 11:32 PM (17 hours 10 mins)

The eleventh module is "Log and Event Analysis" and the instructor for this module are Mr. Sridhar Chandramohan Iyer, Assistant Professor, Universal College of Engineering, Mumbai and Dr. Ajay Prasad, Sr. Astt. Professor, University of Petroleum and Energy Studies, Dehradun. One of the video (Practical Windows Registry Expiation), which are available under Creative Commons Licenses, is adopted from Youtube. There is total 6 video lectures and 1 e-text file in this module. The details of the total views of the video lecture by the users is given below.

Logs & Event Analysis

Practical Windows Registry Explanation	22 views by 22 users	-	Tuesday, 25 January 2022, 11:33 PM (17 hours 10 mins)
Forensic Analysis using AUTOPSY: Linux and Windows	24 views by 22 users	-	Tuesday, 25 January 2022, 11:33 PM (17 hours 10 mins)
Forensics and Log analysis	23 views by 21 users	-	Tuesday, 25 January 2022, 11:33 PM (17 hours 10 mins)
Compare and AUDIT Evidences using Hashdeep	22 views by 21 users	-	Tuesday, 25 January 2022, 11:33 PM (17 hours 10 mins)
Data Carving using Bulk Extractor: Kali Linux and Windows	22 views by 21 users	-	Tuesday, 25 January 2022, 11:33 PM (17 hours 10 mins)
Recovering Evidence from Forensic Images using Foremost	22 views by 21 users	-	Tuesday, 25 January 2022, 11:33 PM (17 hours 10 mins)
Logs & Event Analysis(e-text)	28 views by 23 users	-	Tuesday, 25 January 2022, 11:33 PM (17 hours 10 mins)

The twelfth module is "Application Password Cracking" and the instructor for this module are Mr. Sridhar Chandramohan Iyer, Assistant Professor, Universal College of Engineering, Mumbai and Mr. Rishikesh Ojha. One of the video(Common Password threats), which are available under Creative Commons Licenses, is adopted from Youtube. There is total 6 video lectures and 1 e-text file in this module. The details of the total views of the video lecture by the users is given below.

Application Password Cracking

Introduction to Password Cracking	24 views by 21 users	-	Tuesday, 25 January 2022, 11:33 PM (17 hours 10 mins)
Common Password Threats	24 views by 21 users	-	Tuesday, 25 January 2022, 11:33 PM (17 hours 10 mins)
Password Cracking using John the Ripper	25 views by 21 users	-	Tuesday, 25 January 2022, 11:33 PM (17 hours 10 mins)
Password Cracking using Rainbow Tables	22 views by 21 users	-	Tuesday, 25 January 2022, 11:33 PM (17 hours 10 mins)
PDF File Analysis	27 views by 21 users	-	Tuesday, 25 January 2022, 11:33 PM (17 hours 10 mins)
Remote Imaging using E3 Digital Forensics	25 views by 21 users	-	Tuesday, 25 January 2022, 11:33 PM (17 hours 10 mins)
Application Password Cracking(e-text)	32 views by 23 users	-	Tuesday, 25 January 2022, 11:33 PM (17 hours 9 mins)

The thirteenth module is "Wireless Attacks" and the instructor for this module is Mr. Sridhar Chandramohan Iyer, Assistant Professor, Universal College of Engineering, Mumbai. There is total 1 video lectures and 1 e-text file in this module. The details of the total views of the video lecture by the users is given below.

WiFi Packet Capture and Password Cracking using Aircrack ng	22 views by 21 users	–	Tuesday, 25 January 2022, 11:33 PM (17 hours 9 mins)
Wireless Attacks(e-text)	30 views by 23 users	–	Tuesday, 25 January 2022, 11:33 PM (17 hours 9 mins)

The fourteenth module is "Web Attacks" and the instructor for this module is Mr. Sridhar Chandramohan Iyer, Assistant Professor, Universal College of Engineering, Mumbai. There is total 1 video lectures and 1 e-text file in this module. The details of the total views of the video lecture by the users is given below.

Web Attacks

Introduction to Web Attacks	23 views by 21 users	–	Tuesday, 25 January 2022, 11:34 PM (17 hours 9 mins)
Web Attacks(e-text)	31 views by 23 users	–	Tuesday, 25 January 2022, 11:34 PM (17 hours 9 mins)

The fifteenth module is "Web Attack Forensics" and the instructor for this module is Mr. Sridhar Chandramohan Iyer, Assistant Professor, Universal College of Engineering, Mumbai. There is total 7 video lectures and 1 e-text file in this module. The details of the total views of the video lecture by the users is given below.

Web Attacks Forensics

Website Copier: HTTRACK	21 views by 21 users	–	Tuesday, 25 January 2022, 11:34 PM (17 hours 9 mins)
SQL Injection	23 views by 21 users	–	Tuesday, 25 January 2022, 11:34 PM (17 hours 9 mins)
Site Report Generation: Netcraft	23 views by 21 users	–	Tuesday, 25 January 2022, 11:34 PM (17 hours 9 mins)
Vulnerability Analysis: Nikto	23 views by 21 users	–	Tuesday, 25 January 2022, 11:34 PM (17 hours 9 mins)
Wayback Machine	22 views by 21 users	–	Tuesday, 25 January 2022, 11:34 PM (17 hours 9 mins)
Deep Information Gathering Tool: Dmitry	22 views by 21 users	–	Tuesday, 25 January 2022, 11:34 PM (17 hours 9 mins)
Image Metadata Extraction using Imago	23 views by 21 users	–	Tuesday, 25 January 2022, 11:34 PM (17 hours 9 mins)
Web Attack Forensics(e-text)	39 views by 26 users	–	Tuesday, 25 January 2022, 11:34 PM (17 hours 9 mins)

The sixteenth module is "Electronics Mail" There is total 3 video lectures and 1 e-text file in this module. All the videos (Understanding Email Headers, How to analyze headers using MXtoolbox.com and Email Header Analysis), which are available under Creative Commons Licenses, is adopted from Youtube. The e-text for this module is developed by Dr. Sangram

Panigrahi, Assistant Professor, Siksha 'O' Anusandhan, Bhubaneswar. The details of the total views of the video lecture by the users is given below.

Electronic Mail

Understanding Email Headers	28 views by 23 users	-	Tuesday, 25 January 2022, 10:45 PM (17 hours 58 mins)
How to analyze headers using MXtoolbox.com	29 views by 23 users	-	Tuesday, 25 January 2022, 10:45 PM (17 hours 58 mins)
Email Header Analysis	31 views by 23 users	-	Tuesday, 25 January 2022, 10:45 PM (17 hours 58 mins)
Electronics Mail(e-text)	44 views by 30 users	-	Tuesday, 25 January 2022, 11:20 PM (17 hours 23 mins)

The seventeenth module is "Investigating E-Mail Attacks" and the instructor for this module is Dr. Akashdeep Bharadwaj, Professor, University of Petroleum and Energy Studies, Dehradun. There is total 1 video lecture and 1 e-text file in this module. The details of the total views of the video lecture by the users is given below.

Email Forensics Investigation

Email Forensics Investigations	31 views by 23 users	-	Tuesday, 25 January 2022, 10:45 PM (17 hours 58 mins)
Investigating E-Mail Attacks(e-text)	42 views by 31 users	-	Tuesday, 25 January 2022, 11:20 PM (17 hours 23 mins)

The eighteenth module is "Mobile Device Forensics" and the instructor for this module are Mr. Sridhar Chandramohan Iyer, Assistant Professor, Universal College of Engineering, Mumbai and Mr. Rishikesh Ojha. There is total 2 video lectures and 1 e-text file in this module. The details of the total views of the video lecture by the users is given below.

Mobile Device Forensics

Mobile Forensics	28 views by 23 users	-	Tuesday, 25 January 2022, 10:45 PM (17 hours 58 mins)
Preparation for Digital Forensics investigation	43 views by 30 users	-	Tuesday, 25 January 2022, 11:20 PM (17 hours 23 mins)
Mobile Device Forensics(e-text)	41 views by 31 users	-	Wednesday, 26 January 2022, 4:26 PM (17 mins 4 secs)

The nineteenth module is "Investigative reports, expert witness and cyber regulations" and the instructor for this module are Mr. Sridhar Chandramohan Iyer, Assistant Professor, Universal College of Engineering, Mumbai and Dr. Akashdeep Bharadwaj, Professor, University of Petroleum and Energy Studies, Dehradun. There is total 2 video lectures and 1 e-text file in this module. The details of the total views of the video lecture by the users is given below.

Investigative reports, expert witness and cyber regulations			
Introduction to Report Writing	33 views by 27 users	-	Tuesday, 25 January 2022, 11:20 PM (17 hours 23 mins)
Forensic Reports & Expert Witness	31 views by 27 users	-	Tuesday, 25 January 2022, 11:20 PM (17 hours 23 mins)
Investigative reports, expert witness and cyber regulations(e-text)	39 views by 30 users	-	Tuesday, 25 January 2022, 11:20 PM (17 hours 23 mins)
Digital Forensics Live Session on 22 Jan. 2022 at 06:00 PM	11 views by 10 users	-	Tuesday, 25 January 2022, 11:20 PM (17 hours 23 mins)

The twentieth module is "Practical Handbook" with contains demonstration video lectures of the various aspects of Digital Forensics. These videos are jointly developed by Mr. Sridhar Chandramohan Iyer, Assistant Professor, Universal College of Engineering, Mumbai, Mr. Rishikesh Ojha, Mr. Ketan Joglekar, Assistant Professor, GJ College, Maharastra. The details of the total views of the video lecture by the users is given below.

Practical Handbook			
Practical Handbook	57 views by 42 users	-	Wednesday, 26 January 2022, 8:39 AM (8 hours 4 mins)

Activities Completed by the Participants

Both synchronous and asynchronous activities should incorporate in the online course to encourage the participants to interact with peer group as well teachers. The following table shows the activities such as discussion forum and chat completed by the participants. It is appreciated that the participants were participated the chat which was live activity facilitate to interact with peer and teacher.

Participation in Asynchronous Discussion forum

There are 22 unique threads created by the participants which are answered by mentors, instructors and other participants. The discussion forum has 325 views by 63 users.

Discussion Forum	325 views by 63 users	-	Tuesday, 25 January 2022, 10:40 PM (18 hours 3 mins)

Participation in Live Synchronous Discussion forum

Four live sessions were conducted on:
1. 4th Jan., 2022 at 18:00 Hrs,
2. 11th Jan., 2022 at 18:00 Hrs,
3. 18th Jan., 2022 at 18:00 Hrs, and
4. 22th Jan., 2022 at 18:00 Hrs,

These sessions were conducted through ZOOM sessions and were attended by the participants and the following experts were present online to answer the quarries of the participants.
1. Dr. Jeetendra Pande, UOU

2. Dr. Akashdeep Bharadwaj
3. Gp. Cap. Ashok Kumar
4. Dr. Sangram Panigrahi
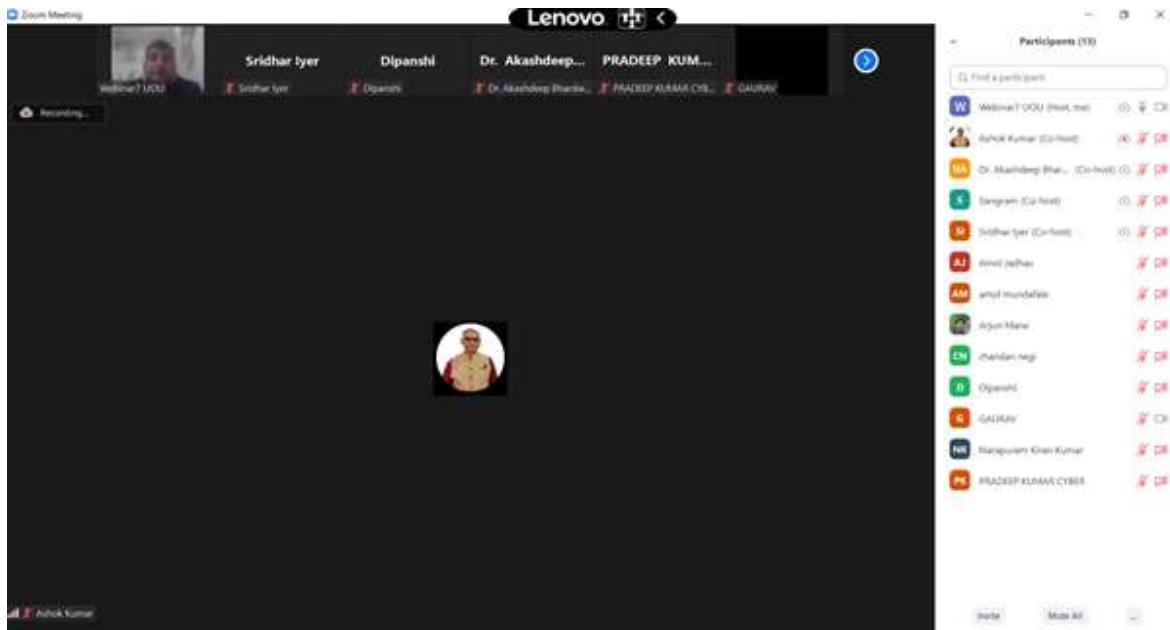5. Mr. Sridhar Chandramohan Iyer

The first live session held on 04th Jan., 2022 was attended by many participants through ZOOM and the session was broadcasted on Youtube.

The second live session held on 11th Jan., 2022 was attended by many participants through ZOOM and the session was broadcasted on Youtube.

The third live session held on 18th Jan., 2022 was attended by many participants through ZOOM and the session was broadcasted on Youtube.

The fourth live session held on 22nd Jan,, 2022 was attended by many participants through ZOOM and the session was broadcasted on Youtube.
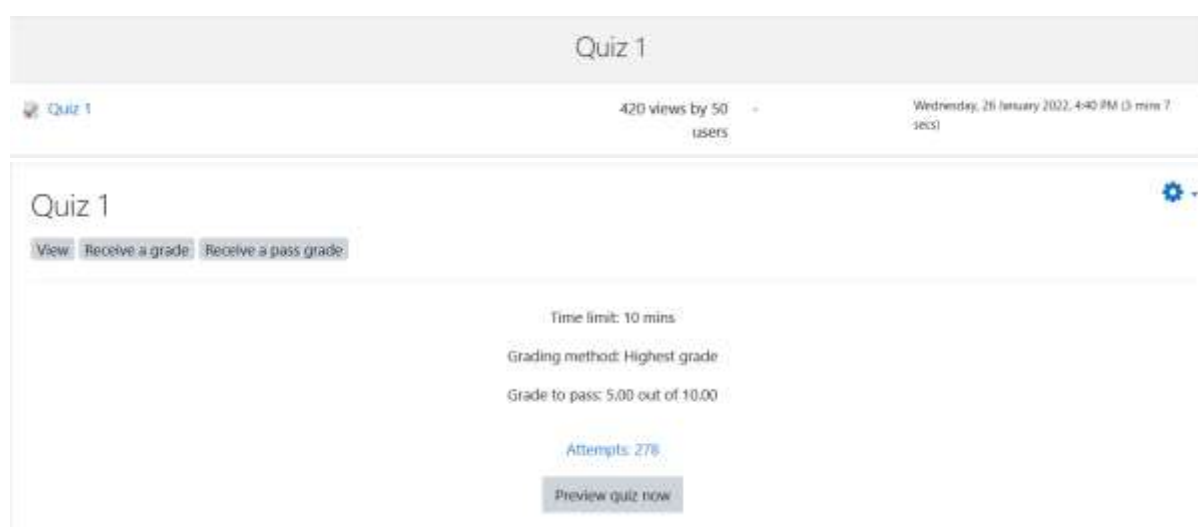

Digital Forensics: Live Session on 22 Jan. 2022 at 06:00 PM

· Streamed live on Jan 22, 2022

Quizzes

The course has four quizzes and it was mandatory to score 50% or more in all the four quizzes individually in unlimited attempts. The quiz consists of MCQ type of assessment with no negative marking.
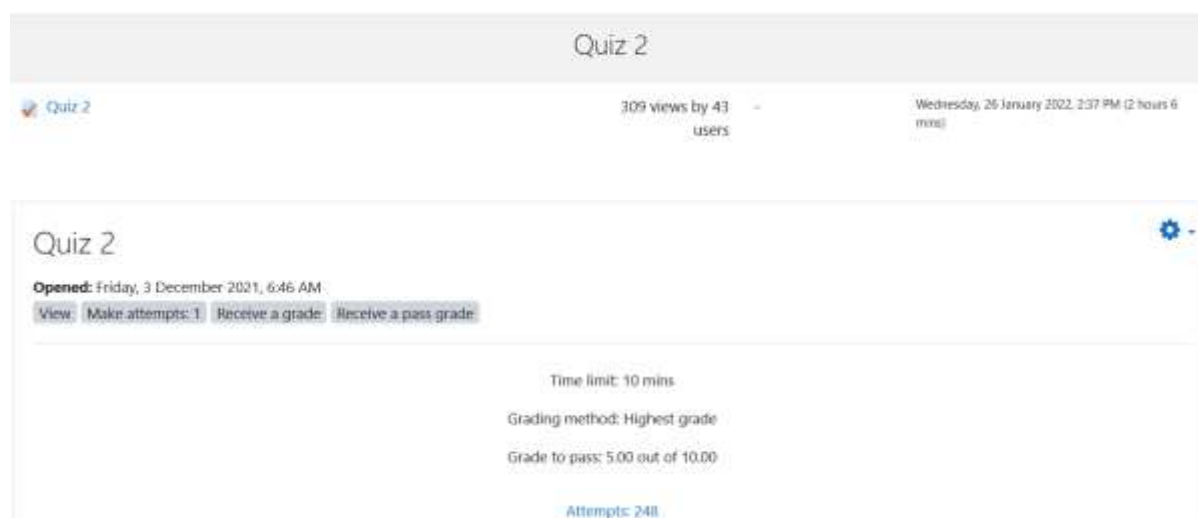
S. No.	Quiz	No. of questions	Total time	Max. Score	Min. max to clear the quiz
1	Quiz 1	10	10 mins	10	05
2	Quiz 2	10	10 mins	10	05
3	Quiz 3	10	10 mins	10	05
4	Quiz 4	10	10 mins	10	05

Quiz 1 has total 420 views by 50 users. Total number of attempts for Quiz 1 is 278.

Quiz 2 has total 309 views by 43 users. Total number of attempts for Quiz 2 is 248.

Quiz 3 has total 243 views by 40 users. Total number of attempts for Quiz 3 is 186.

QUIZ 3

Quiz 3 — 243 views by 40 users — Wednesday, 26 January 2022, 2:40 PM (2 hours 3 mins)

Quiz 3

View   Receive a grade   Receive a pass grade

Time limit: 10 mins

Grading method: Highest grade

Grade to pass: 5.00 out of 10.00

Attempts: 186

Quiz 4 has total 306 views by 43 users. Total number of attempts for Quiz 4 is 191.

QUIZ 4

Quiz 4 — 306 views by 43 users — Wednesday, 26 January 2022, 2:43 PM (2 hours)

Quiz 4

View   Receive a grade   Receive a pass grade

Time limit: 10 mins

Grading method: Highest grade

Grade to pass: 5.00 out of 10.00

Attempts: 191

Feedback

After the completion of the online training program on Digital Forensics, all the participants have to fill the feedback form. The feedback form was filled by 141 participants.

Feedback

View   Submit feedback

Overview   Edit questions   Templates   Analysis   Show responses   Show non-respondents

Overview

Submitted answers: 141
Questions: 45

Out of total 141 respondents, 113 (80.14 %) participants are Male and 28 (19.86 %) are Female. The course has nearly four-time Male participants as compared to the Female.

You are a
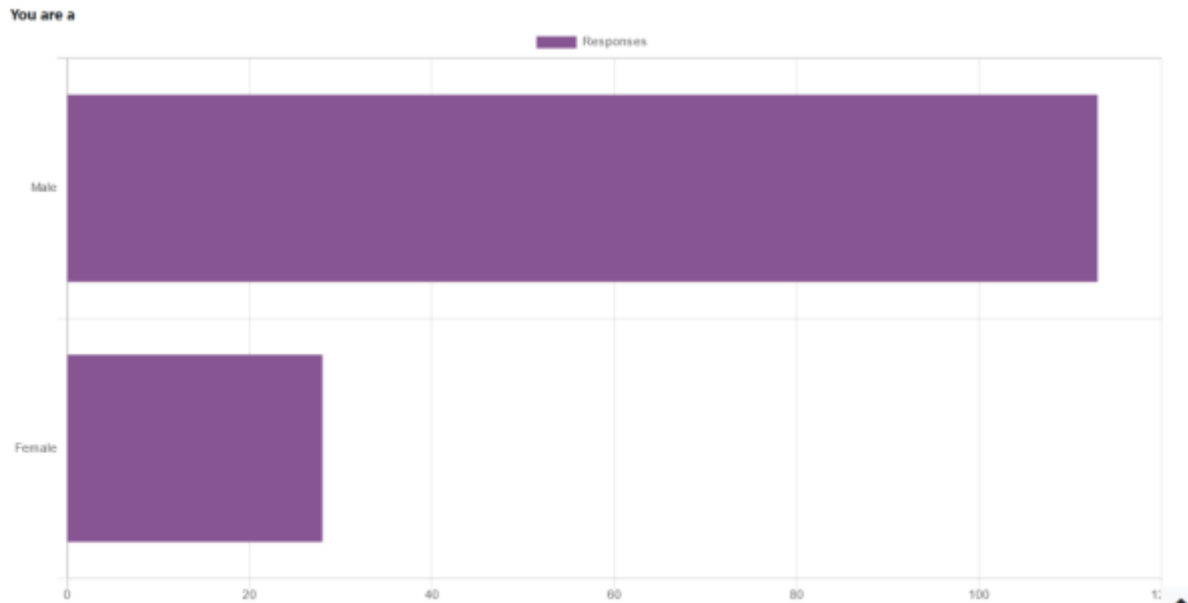
Most of the respondents were form India 138 (97.87 %). Interestingly there are 3 (2.13 %) respondents outside India.

Location
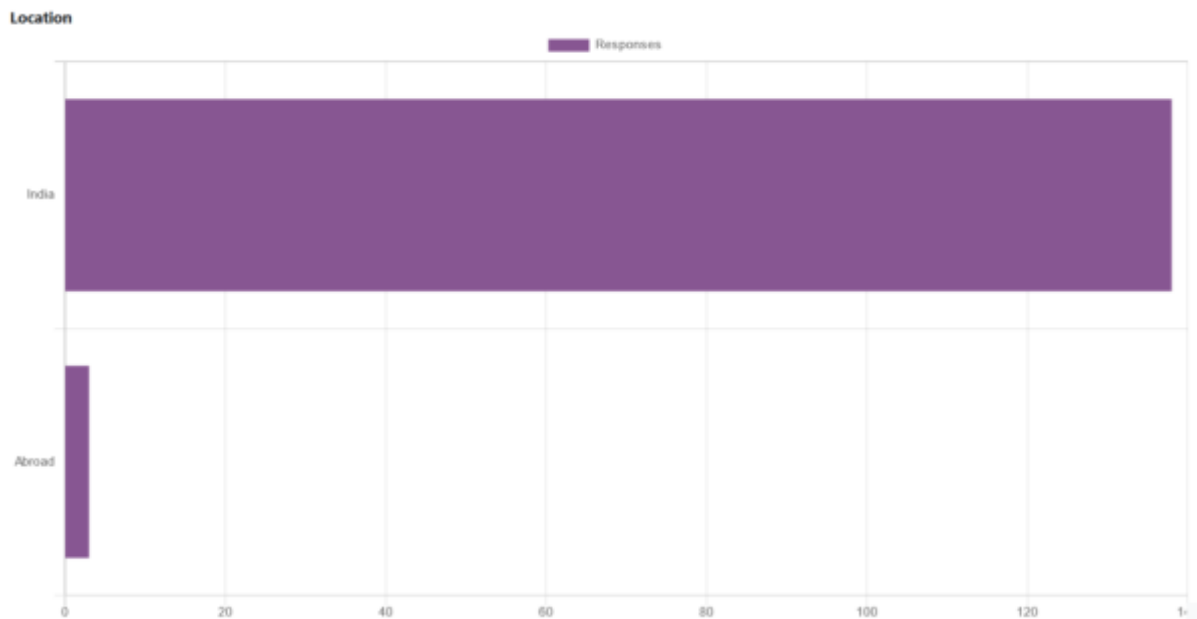
The survey has respondents from almost all the States and Union Teritories The details of the representation from each Indian States and Union Teritories are as follows:

Andhra Pradesh	8 (5.67 %)
Arunachal Pradesh	0
Assam	0
Bihar	2 (1.42 %)
Chhattisgarh	1 (0.71 %)
Goa	0
Gujarat	7 (4.96 %)

Haryana	0
Himachal Pradesh	2 (1.42 %)
Jharkhand	0
Karnataka	6 (4.26 %)
Kerala	3 (2.13 %)
Madhya Pradesh	5 (3.55 %)
Maharashtra	19 (13.48 %)
Manipur	0
Meghalaya	2 (1.42 %)
Mizoram	0
Nagaland	0
Odisha	1 (0.71 %)
Punjab	2 (1.42 %)
Rajasthan	6 (4.26 %)
Sikkim	0
Tamil Nadu	20 (14.18 %)
Telangana	7 (4.96 %)
Tripura	0
Uttar Pradesh	13 (9.22 %)
Uttarakhand	16 (11.35 %)
West Bengal	11 (7.80 %)
Andaman and Nicobar Island	0
Chandigarh	0
Dadra and Nagar Haveli and Daman and Diu	0
Delhi	5 (3.55 %)
Ladakh	0
Lakshadweep	0
Jammu and Kashmir	3 (2.13 %)
Puducherry	0
Others	2 (1.42 %)

State

The data revealed that most of the respondents 68 (48.23%) are in the age group under 17 to 24, while about one forth 37 (26.24 %) are between 25 to 34 age group, followed by 27 (19.15%) respondents from 35 to 44 age group. 45 to 54 age group have 7 (4.96 %) respondents. Interestingly there is only 2(1.42%) respondents from 55 to 64 age group. There is no participation from above 65 age group and below 17 age group.

You are in the age group of:
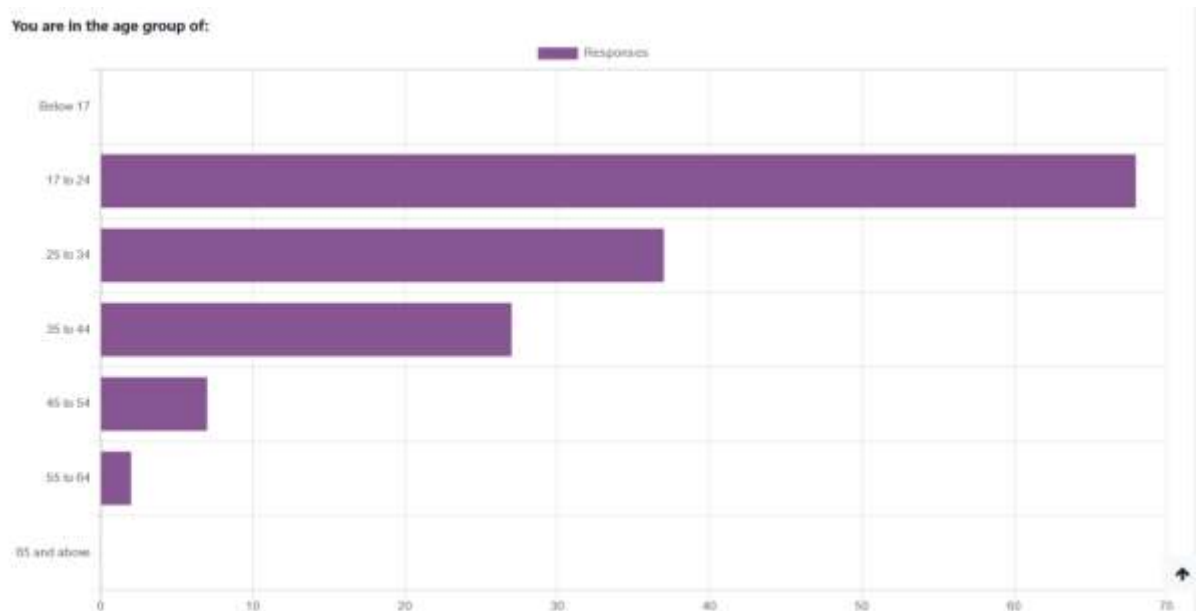
The data revealed that more than three-fourth of the respondents 106 (75.18 %) were from Science & Technology discipline, while 9 (6.38 %) of them were from Humanities. Commerce discipline is covered by only 3 (2.13 %) respondents. The least number of respondents 1 (0.71 %) are from Languages. There are 22 (15.60 %) respondents from Others discipline.

Your subject specialization is ?
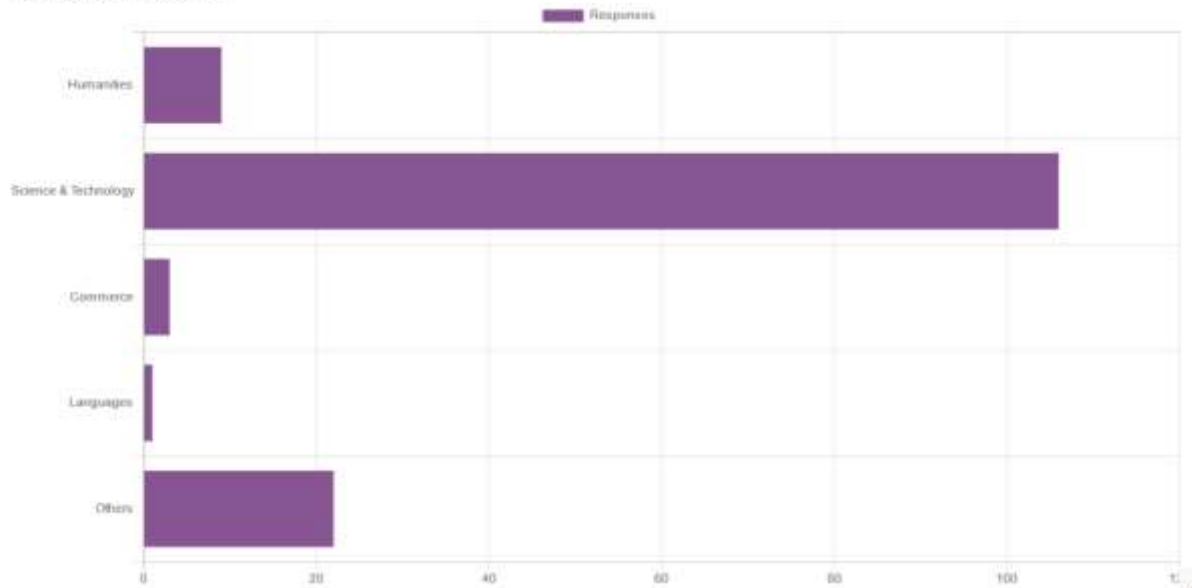
The respondents were not only the students 89 (63.12 %), but Faculty Members 18 (12.77%), Government Officers 12 (8.51 %) and Educational Administrators 8 (5.67 %). There is a good number of un-affiliated 14 (9.93 %) respondents also.

You are a:
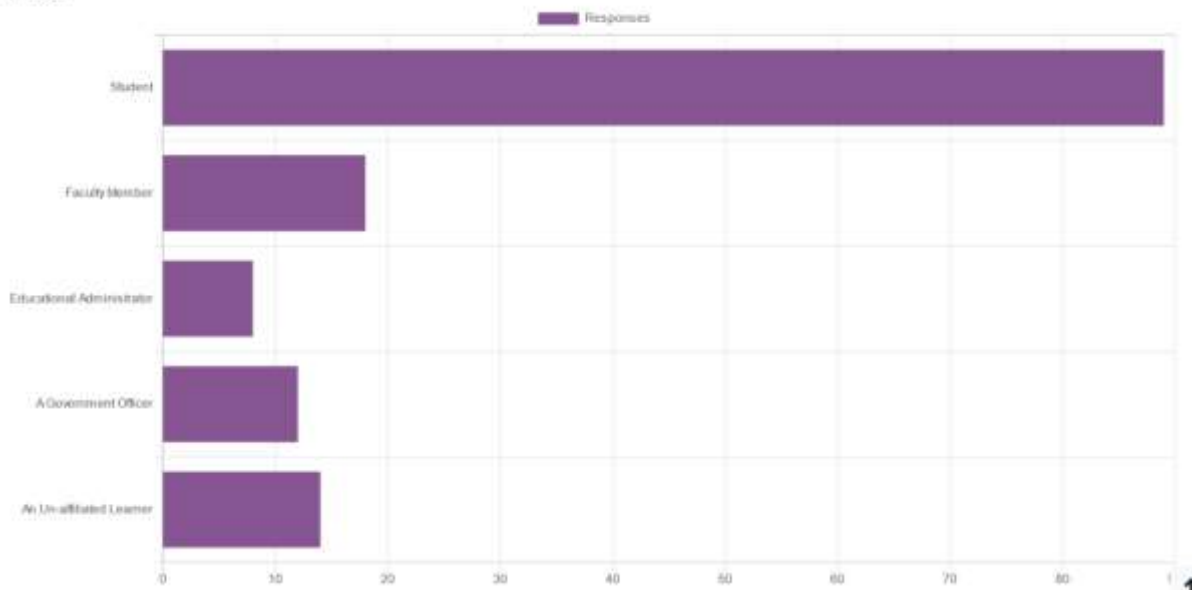
The respondents were asked questions related to the Instructor to Learner Interaction, Instructor Support, Instructor Feedback, Learner to Learner Interaction, Course Content, Course Structure, Information Delivery Technology, Perceived Effectiveness and Learner Retention of the online training program on Digital Forensics and the item were measure the analysed on 5-point scale from 1 for strongly disagree, 2 for disagree, 3 for neutral, 4 for agree, and 5 for

strongly agree. The questioner is adopted from "Exploring the factors affecting MOOC retention: A survey study[1]" which is available under a Creative Commons license.

S.No.		Total	Strongly Agree (5)	Agree (4)	Undecided (3)	Disagree (2)	Strongly Disagree (1)	Average
1	I felt free to ask questions throughout this course	141	80	57	4	0	0	4.54
2	The instructor responded to my questions in a timely manner	141	69	65	6	0	1	4.43
3	The instructor was easily accessible to me	141	70	64	7	0	0	4.45
4	I felt free to express and explain my own views throughout this course	141	71	59	11	0	0	4.43
5	The instructor played an important role in facilitating learning in this course	141	85	54	2	0	0	4.59
6	The instructor contributed to the discussions in this course	141	77	59	4	1	0	4.50
7	The instructor was actively helpful when students had problems	141	72	64	5	0	0	4.48
8	I have interacted with the instructor in this course	141	55	61	16	6	3	4.13
9	The instructor emphasized relationships between and among topics	141	68	68	5	0	0	4.45
10	The instructor was responsive to student concerns	141	70	67	2	2	0	4.45
11	The instructor provided timely feedback on assignments, exams or projects	141	68	64	9	0	0	4.42
12	The instructor provided helpful timely feedback on assignments, exams or projects	141	62	71	8	0	0	4.38
13	I felt as if the instructor cared about my individual learning on this course	141	62	69	8	1	1	4.35
14	The group work contributed significantly to this course	141	52	65	20	4	0	4.17
15	Group size was appropriate for course purposes	141	51	68	21	1	0	4.20
16	Student interaction was an important learning component of this course	141	63	64	10	4	0	4.32
17	This course provided an opportunity to learn from other students	141	62	69	6	3	1	4.33
18	I had sufficient opportunity to interact with other students on this course	141	53	67	17	3	1	4.19
19	This course effectively challenged me to think	141	81	55	2	3	0	4.52
20	Course assignments were interesting and stimulating	141	78	57	5	1	0	4.50

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[1] Kate S. Hone, Ghada R. El Said, Exploring the factors affecting MOOC retention: A survey study, Computers & Education, Volume 98, 2016, Pages 157-168,

#	Item		5	4	3	2	1	Avg
21	This course was up-to-date with developments in the field	141	69	68	3	0	1	**4.45**
22	Student evaluation techniques such as projects, assignments, and exams were related to the learning objectives of this course.	141	69	65	7	0	0	**4.44**
23	This course included applied learning and problem solving	141	75	60	5	1	0	**4.48**
24	The structure of the modules was well prepared and organized	141	81	60	0	0	0	**4.57**
25	Projects/assignments were clearly explained	141	72	61	7	1	0	**4.45**
26	I understood what was expected of me	141	75	62	4	0	0	**4.50**
27	The interactive content of this course was effectively communicated	141	79	57	5	0	0	**4.52**
28	The interactive content of this course included information not covered in printed material of the same course	141	55	62	17	5	2	**4.16**
29	The interactive content of this course contributed towards learning	141	77	63	1	0	0	**4.54**
30	I have learned a lot in this course	141	87	53	1	0	0	**4.61**
31	I would recommend this course to friends/colleagues	141	87	53	0	0	1	**4.60**
32	I have enjoyed taking this course	141	89	51	1	0	0	**4.62**

The average responses of the respondents follow between 4.62 to 4.13 which indicated positive agreement of them towards the items related to Instructor to Learner Interaction, Instructor Support, Instructor Feedback, Learner to Learner Interaction, Course Content, Course Structure, Information Delivery Technology, Perceived Effectiveness and Learner Retention.

Instructor to Learner Interaction

The average responses of the respondents follow between 4.54 to 4.43 which indicated positive agreement of them towards the items related to Instructor to Learner Interaction. Most of the respondents reported that they felt free to ask questions throughout this course (Avg: 4.54). They reported positively in response to the question where they were asked about the timely response of the instructor responded to their questions (Avg: 4.33). They agreed that the instructor was easily accessible to them (Avg: 4.45). They also felt free to express and explain their own views throughout this course (Avg: 4.43).

Instructor Support

The average responses of the respondents follow between 4.59 to 4.13 for the items related to Instructor Support. They agreed that the instructor played an important role in facilitating learning in this course (Avg: 4.59). They also reported positively to the item which enquired about the instructor contributed to the discussions in this course (Avg: 4.50). They also reported that the instructor was actively helpful when students had problems (Avg: 4.48). Most of the respondents have interacted with the instructor in this course (Avg: 4.13). They also reported that the instructor emphasized relationships between and among topics (Avg: 4.45).

Instructor Feedback

The average responses of the respondents follow between 4.45 to 4.35 for the items related to Instructor Feedback. They reported positively that the instructor was responsive to student concerns (Avg: 4.45). They also reported positively that the instructor provided timely feedback on assignments, exams or projects (Avg: 4.42). Similarly, the instructor provided helpful timely feedback on assignments, exams or projects (Avg: 4.38). Additionally, respondents admitted that they felt as if the instructor cared about their individual learning on this course (Avg: 4.35).

Learner to Learner Interaction

The average responses of the respondents follow between 4.33 to 4.17 for the items related to Learner-to-Learner Interaction. The participants agreed that the group work contributed significantly to this course (Avg: 4.17). They also felt that Group size was appropriate for course purposes (Avg: 4.20). The respondents admitted that Student interaction was an important learning component of this course (Avg: 4.32). The respondents accepted that this course provided an opportunity to learn from other students (Avg: 4.33). Similarly, they had sufficient opportunity to interact with other students on this course (Avg: 4.19).

Course Content

The average responses of the respondents follow between 4.52 to 4.44 for the items related to Course Content. Most of the respondents felt that this course effectively challenged me to think (Avg: 4.52). They also reported positively that course assignments were interesting and stimulating (Avg: 4.50). They admitted that this course was up-to-date with developments in the field (Avg: 4.45). The also accepted that Student evaluation techniques such as projects, assignments, and exams were related to the learning objectives of this course (Avg: 4.44). They also agreed that this course included applied learning and problem solving (Avg: 4.48).

Course Structure

The average responses of the respondents follow between 4.57 to 4.45 for the items related to Course Structure. Most of the respondents reported that the structure of the modules was well prepared and organized (Avg: 4.57). That also admitted that the projects/assignments were clearly explained (Avg: 4.45). They also understood what was expected of them (Avg: 4.50).

Information Delivery Technology

The average responses of the respondents follow between 4.54 to 4.16 for the items related to Information Delivery Technology. The respondents reported that the interactive content of this course was effectively communicated (Avg: 4.52). They also accepted that the interactive content of this course included information not covered in printed material of the same course (Avg: 4.16). Additionally, they also agreed that the interactive content of this course contributed towards learning (Avg: 4.54).

Perceived Effectiveness

The average responses of the respondents follow between 4.62 to 4.60 for the items related to Perceived Effectiveness. They agreed that they have learned a lot in this course (Avg: 4.61).

The respondents were also willing to recommend this course to friends/colleagues (Avg: 4.60). Most of the respondents accepted that they have enjoyed taking this course (Avg: 4.62).

Out of total 141 respondents, 125(88.65%) reported that they completed the MOOC to earn a credential signifying official completion.

Question	Yes	No
Did you complete the MOOC to earn a credential signifying official completion?	125 (88.65%)	16 (11.34%)

Out of the respondents who dropped the course, 8 (5.67%) respondents reported that they dropped the course within first few days, 3(2.12%) of them dropped within first few weeks, 5 (3.54%) towards the middle of the course, 4(2.83%) towards the end of the course and 10 (7.09 %) respondents dropped the course just before the end.

Question	Not applicable, as I officially completed the course	First few days	First few week	Towards the middle	Towards the end	Just before the end
If no, when did you drop out?	111 (78.72 %)	8 (5.67%)	3 (2.12%)	5 (3.54%)	4 (2.83%)	10 (7.09 %)

113(80.14%) respondents completed all the exercises/assessments in the MOOC, 20(14.18%) completed most of the exercises/assessments, 3(2.12%) completed almost half, 3(2.12%) respondents completed a few exercises/assessments and 2(1.41%) participants reported that they not completed none of the exercises/assessments in the MOOC.

Question	All	Most	Around Half	A few	None
How many exercises/assessments did you complete in the MOOC?	113 (80.14%)	20 (14.18%)	3 (2.12%)	3 (2.12%)	2 (1.41%)

In response to the item "How much of the MOOC content do you estimate you watched or read?", 90 (63.82 %) respondents reported that they have watched/ read all the contents of the MOOC, 39 (27.65 %) reported they watched/ read most the contents, 5 (3.54 %) reported around half, 5 (3.54 %) reported a few and 2 (1.41 %) respondents reported that they have watched/ read none the contents of the MOOC.

Question	All	Most	Around Half	A few	None

How much of the MOOC content do you estimate you watched or read?	90 (63.82 %)	39 (27.65 %)	5 (3.54 %)	5 (3.54 %)	2 (1.41 %)

After completing all the mandatory requirements for successfully completing the online training program, 129 participants downloaded the certificate.

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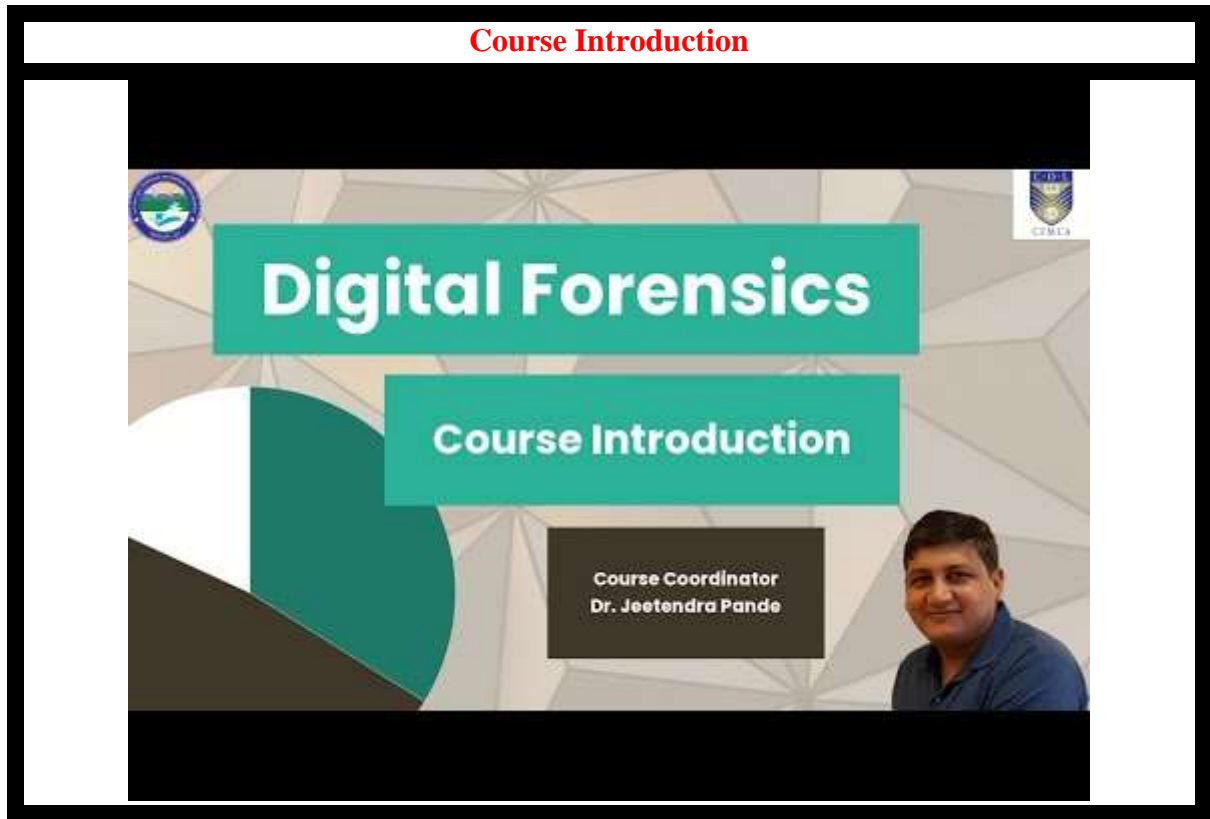
Dr. Ashutosh Kumar Bhatt, Associate Professor, Uttarakhand Open University, Haldwani

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Course Introduction

COURSE FEE

Free

COURSE START DATE

24 December, 2021

COURSE REGISTRATION LINK

https://forms.gle/xmVSVc4EBGRm637g8

This MOOC has been prepared with the support of

CEMCA