FACULTY DEVELOPMENT PROGRAM (FDP)

ON

CYBERSECURITY & CYBERWAR (CnC 2019)

JUNE 3 - 7, 2019

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University of Petroleum and Energy Studies
Department of Systemics
School of Computer Science
Bidholi, Dehradun, India

PREAMBLE

The aim of this program is to promote research aspects in internet security, familiarize with tools available for network scanning (anti-virus, anti-spam and anti-spyware scans), identify and synthesize needs for internet security techniques (firewall, honeypots etc.), share information and practical awareness for data and system protection from cyber-attacks (prevent, detect and respond) etc. The FDP will start with an overview of cybersecurity, information security and cryptography aspects to help the audience understand importance of these aspects in real life scenarios. This FDP is planned into two parts: technical session and hands-on session. The technical session part of the FDP will focus on the most challenging contemporary issues in cybersecurity (cyber threat, cyber incidents, cyber threat sharing, cyber technology evolution etc.), data science (collection, analysis and visualisation) and cryptography. The hands-on session part will extend the discussion to address the practical evaluation of security tools and techniques, machine learning for data analysis and data forensics, and implementation of cryptography primitives and protocols. After each session, a small group breakout session will be conducted where key topics from the current session are addressed with participants helping identify recent trends and research gaps. At the end of FDP, summary of key findings and takeaways will be presented.

PEDAGOGY

The sessions of this Faculty Development Program shall be conducted by the team of eminent academicians & industry experts possessing in-depth knowledge in the area of Cybersecurity. It will consist of a series of lectures and hands-on practical sessions.

- Chief Patron: S. J. Chopra, Chancellor, UPES, Dehradun, India
- Patron: Deependra Kumar Jha, Vice Chancellor, UPES, Dehradun, India
- General Chair: Manish Prateek, Professor and Dean, School of Computer Science, UPES, Dehradun, India
- General Co-chair: Neelu Jyoti Ahuja, Professor and HoD (Dept. of Systemics), School of Computer Science, UPES, Dehradun, India
- Program Advisor, T. P. Singh, Professor and HoD (Dept. of Informatics), School of Computer Science, UPES, Dehradun, India
- Program Advisor, Monit Kapoor, Assoc. Professor and HoD (Dept. of Cybernetics), School of Computer Science, UPES, Dehradun, India
- Program Advisor, Ajay Parsad, Assoc. Professor and HoD (Dept. of Computer Applications), School of Computer Science, UPES, Dehradun, India
- Program Advisor, Deepshikha Bhargava, Professor and HoD (Dept. of Virtualisation), School of Computer Science, UPES, Dehradun, India
- Program Advisor, Hanumat Sastry G., Assoc Prof. and Assoc. Dean (Planning), School of Computer Science, UPES, Dehradun, India
- Program Advisor, Kiran Kumar Ravulakollu, Assoc. Prof. and Assoc. Dean (Research), School of Computer Science, UPES, Dehradun, India
- Convener: Adarsh Kumar, Associate Professor, UPES, Dehradun, India
- Program Coordinator: Alok Aggarwal, Professor, UPES, Dehradun, India

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Day 1 (9:30 - 5:30): Data Scanning and Penetration Testing Tools

- **INAGURATION**
- **LAMP LIGHTING and SARASWATI VANDANA**
- **TECHNICAL SESSION**
  - **Expert Talk-1 (Certification of Crypto Products)**
    (Speaker: Professor M R Muralidharan, Chief Research Scientist, Indian Institute of Science, Banglore, Karnataka, India)

- **HANDS-ON SESSION**
  (Speaker: Dr. Adarsh Kumar)
  - Overview of Cybersecurity, its security architectures, and security implications and adoption of evolving technology.
  - **Wireshark**: installation, data scanning, command based executions, data capturing, Python programming for captured data analysis, Tshark, running tcpdump, dumpcap, Monitoring cyber-attacks (DoS, DDoS, Port Scanning, Phising, web vulnerabilities, encrypted traffic, malware attack), I/O graphs, anomaly detection, traffic issues etc.
  - **NMAP:** scanning smaller to larger networks, scanning servers, running existing scripts, privilege escalation and RDP scanning etc.
  - **Metasploit:** port scanning, vulnerability scanning, exploitations (windows, website and network), meterpreter, meterpreter scripts, advanced exploitations (MSFencode attack, social engineering toolkits etc.), Bypassing UAC etc.
  - **OpenVAS**: installation, configuration, host discovery, port scanning, application and os detection, report generation and analysis etc.
  - **Nessus**: installation, configuration, host discovery, port scanning, application and os detection, report generation and analysis etc.
  - **Maltego:** creating project, data mining with Maltego, scanning information, listing vulnerabilities, exploring modules, network statistics with graphical representation etc.
  - **Other Tools:** Introduction and comparative analysis of following tools: IronWASP, Nikto, SQLMap, SQLNinja, Wapiti, AirCrack-ng, Reaver, Ettercap, Canvas etc.

Day 2 (9:30 - 5:30): Web Penetration Testing

- **TECHNICAL SESSION**
  - **Expert Talk-2 (Quantum Cryptography and Quantum Key Distribution)**
    (Speaker: Professor Anil Prabhakar, Department of EE, Indian Institute of Technology Madras, Chennai, India)

- **HANDS-ON SESSION**
  (Speaker: Dr. Adarsh Kumar)
  - **Burp suite**: environment setup, Burp Suite Example, threat modelling, web intrusion tests etc.
  - **Linux web penetration testing**: Web application brute forcing using OWASP DirBuster, OWASP Zed Attack Proxy (ZAP), spider a website, ZAP Spider, webscarab, hydra, manual vulnerability analysis using cookies, Damn vulnerable web app, shellshock, privilege escalation, and post exploitation etc.
  - **Attack Scenarios**: Server-side attacks, client-side attacks, authentication based attacks, session management and hijacking, web-attacks, BURP, OWASP-ZAP, Fimap, Low Orbit Ion Cannon etc.
  - **Attack Defenses:** Defense measurements, Environnment cloning, Protection against attacks (MiM, DoS, DDoS, Cookie, Clickjacking etc.
  - Automated web penetration testing using python, SQL injection attack, cross-site scripting attack, cross-site forgery attack, denial of service (DoS) attack etc.

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Day 3: (9:30 - 5:30): Network Penetration Testing

- **TECHNICAL SESSION**
  - **Expert Talk-3 (Security Aspects in Mobile Networks)**
    (Speaker: Prof. Alok Aggarwal, UPES, Dehradun, India)

- **HANDS-ON SESSION**
  (Speaker: Dr. Adarsh Kumar and Mr. Saurabh Jain)
  - **Lua Programming:** basics, value types, array, functions, tables, meta-tables, modules, file i/o, object oriented programming, debugging, error and exception handling etc.
  - **NSE Scripting:** Data file handling (data discovery, brute force, web application auditing, DBMS auditing, jaba debug files etc.), advanced scripts (versioning, network sockets, binary data, vulnerability table etc).
  - **Threat and Vulnerability Assessment**: OSINT cycle, information collection websites, service enumeration, MASSCAN, web frontend and backend information gathering, Zenmap, Tripwire SeureCheq scanner etc.
  - Email tracing, mylast search, USB Device, Root-me challenges, wasitviewed, Burpsuite Scanner, Zenmap, Acunetix, SQL injection, Malicious SQL statements, Smart Script, SQL Injection(SQLI) Attack, Performing SQL Injection Attack (Hands On) through: Own Interface(Java based), MYSQL command Line client, Acunetix, Browser and SQL Injection Prevention Technology.

Day 4 (9:30 - 5:30): Blockchain and Mobile Penetration Testing

- **TECHNICAL SESSION**
  - **Expert Talk-4 (Expert System integrated Cybersecurity Systems)**
    (Speaker: Prof. Neelu Jyoti Ahuja, UPES, Dehradun, India)

- **HANDS-ON SESSION**
  (Speaker: Dr. Adarsh Kumar)
  - **Blockchain:** introduction, advantage over conventional distributed database, blockchain network, mining mechanism, distributed consensus, Merkle Patricia Tree, Gas Limit Transactions and Fee, Anonymity, Reward, Chain Policy, Life of Blockchain application, Soft and Hard Fork, Private and Public Blockchain.
  - **Cryptocurrency:** history, distributed ledger, Bitcoin protocols-mining strategy and rewards, Ethereum- construction, DAOsmart contract, GHOST, vulnerability, attacks, sidechain, namecoin. Cryptocurrency Regulations: stakeholders, roots of bitcoin, legal aspects - cryptocurrency exchange, black market and global economy.
  - **Pen testing on Android platform:** Installing android sdk, android application writing, application forensics, environment setup, rooting and jailbreaking etc.
  - **Pen testing on iOS platform::** installing Xcode and iOS simulator, writing iOS application, application forensics, environment setup, rooting and jailbreaking etc.

Day 5 (9:30 - 5:30): Data Forensics

- **TECHNICAL SESSION**

  Expert Talk-5 (Predictive Cyber Defence with Artificial Intelligence and Machine Learning)

  (Speaker: Prof. Mayank Dave, NIT, Kurukshetra, Haryana, India)

- **HANDS-ON SESSION**
  (Speaker: Dr. Adarsh Kumar)
  - ***Malware Analysis***: Malware types, Malware Sources, Static Analysis, Malware Fingerprinting, File obfuscation, Exeinfo PE, pestudio, PPEE(puppy), Resource Hacker, Yara, Yara Rule basics, Dynamic analysis, Noriben, INetSim, Analysing malicious binaries, code injection and hooking, obfuscation techniques, memory forensics, advanced malware detection, Cuckoo malware analysis etc.

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- Python programming using pcapy and scapy, programming for listing directory, file, registry and application properties, capturing system logs, analysing window and linux memories etc.
- Forensics Algorithms, creating and analysing window and linux logs, window registry analysis, virtualization forensics, Cryptography with python, python paramiko, juniper networks, pygal, pysnmp, PyHook, Pywin,
- Data Science and Python Machine Learning for Time Series Analysis (cybersecurity datasets, designing packet sniffer, preparing datasets, training-validating-testing datasets, reading datasets for data frame analysis, applying data analytics, visualising network and attack statistics)

- **VALEDICTORY FUNCTION**
- **VOTE OF THANKS (by FDP Convener- Dr. Adarsh Kumar)**

REGISTRATION FEE PARTICULARS

- Early Bird Registration: Faculty Members / Research Scholars /Staff Members : Rs. 2,500/-
- SC/ST Faculty members / Research Scholars :Rs. 1500/-
- Industry participants : Rs. 5,000/-
- Late Registration: Rs. 500/- extra in each category.

*Registration fee includes working lunch (for 5 days), light snacks, water bottles, FDP kits and certificates.

IMPORTANT DATES

Date of Registration (Open)	15 March, 2019
Early Bird Registration	15 May, 2019
Date of Registration (Close)	31 May, 2019
Duration	One Week (3-7 June, 2019)

PAYMENT GATEWAYS

Pay Online-NEFT / RTGS / Wire Transfer in our Yes Bank Account. While making online payment, participants are further requested to mention their Name and Affiliation in Payment Remark to enable us to trace your payment in the Bank Statement. Kindly also note to add the applicable bank charges, if any, for online payment.

No Cheque/Cash payment is accepted.

Bank Details

Beneficiary Name	:	Cybersecurity and Cyberwar
Account Number	:	95958777777784
IFSC number	:	YESB0000115
Bank name	:	YES Bank Rajpur Road Dehradun

VENUE

University of Petroleum and Energy Studies, Bidholi Campus, Dehradun, Uttrakhand, India

HOW TO APPLY (POST-PAYMENT)

Fill the registration form available over following URL:

Website: http://tinyurl.com/y2aaq3hd

SELECTION CRETERIA

Selection will be done based on first-come-first-serve basis to a maximum number of 60 (sixty). Additionally 10 participants from industry are allowed to participate. The list of selected participants will be intimated through e-mail. In case a candidate is not selected, the amount will be sent back.

FDP WEBSITE

Website 1: http://tinyurl.com/y2aaq3hd

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Website 2: https://adarshkumar10.wixsite.com/fdp-cnc2019

CERTIFICATION

Department of Systemics of School of Computer Science (SoCS), University of Petroleum and Energy Studies, Dehradun, India will award the 'Certificate of Participation" to each participant after completion of the program.

ACCOMODATION

Accommodation can be arranged in Hostels (twin sharing) on self-payment basis (Rs. 300/- (including breakfast and dinner)) for participants from distant colleges subject to availability. Suggested list of hotels in nearby locality is available over FDP website.

ADDITIONAL REQUIREMENTS

1. In order to successfully execute programming codes, it is mandatory for all participants to bring their laptops with administrator rights. All other resources (codes, books, study material, networking equipment etc.) will be provided by speakers.
2. If possible, kindly install Ubuntu 18.10 LTS either in dual boot or in virtual environment.
3. All participants must have basic knowledge of C or Python and Linux platform.

TARGET AUDIENCE

This FDP would be useful for the persons from academia and industry who would like to gain expertise and excel their skill set in field of cybersecurity, information security and cryptography.

ABOUT UPES

Established in 2003 through the UPES Act, 2003 of the State Legislature of Uttarakhand, UPES is a UGC-recognized and NAAC-accredited University. UPES is globally recognized by QS Ratings with 5 Stars for both employability (placements) and campus facilities and 4 Stars for teaching. UPES offers industry-aligned and specialized graduate and postgraduate courses through its five schools: School of Engineering, School of Computer Science, School of Design, School of Law and School of Business. Given its industry-oriented programs and emphasis on holistic development, UPES graduates are a preferred choice for recruiters, ensuring a track record of 90% + placements over the last few years. UPES is driven by its core philosophy and purpose of delivering outstanding student outcomes.

OFFLINE REGISTRATION FORM

After making payment either fill online form, or fill this registration form and send it over email id: 'adarsh.kumar@ddn.upes.ac.in' with subject line: CnC 2019 registration.

1. Name:
2. Designation :
3. Institution :
4. Email:
5. Ph. No
6. Bank Transaction ID:
7. Address for Correspondence
8. Educational Qualifications with specialization:
9. Subjects taught so far:
10. No. of refresher courses/workshops attended:
11. Experience (in years) Teaching:

Research:

Industry:

12. Accommodation required (on payment basis): YES / NO
13. Are you belong to SC/ST: YES/NO

(If yes, please specify and attach a copy of caste certificate to claim the concession)

Declaration

The information provided is true to the best of my knowledge. If selected, I agree to abide by the rules and regulations of the FDP and shall attend the course for the entire duration. I also undertake the responsibility to inform the Coordinator in case, I am unable to attend the course.

Place:

Date:

Signature of the applicant

HOW TO REACH US

By Air
Jolly Grant Airport is a domestic airport which is situated at a distance of 25 kms from the centre of the city. The nearest International Airport is situated in New Delhi, at a distance of about 235 kms from Dehradun and provides approximately 7 daily flights to Dehradun.

By Rail
Dehradun Railway Station is the nearest rail head of the Northern Railways .The railway station is situated at a distance of about 2 kms from the center of the city. Major cities like Delhi, Kolkata, Varanasi, Ujjain and Indore are connected by regular as well as frequent train services from the main city. Regular buses as well as taxi are available right from the railway station.

By Road
State owned Uttarakhand Transport provides regular bus service (Deluxe A/C bus , Volvo, and various other categories of buses) from the main city to all major destinations.

How to Reach UPES Campus from Dehradun City
By Taxi/Auto
After reaching the Airport / Railway Station / Bus Stand , Taxi / Auto will be available 24 Hours. The fare for taxi is approx Rs 1200/- (from Airport) and approx Rs. 500 (from Railway / Bus stand).

By Private Vehicle
From Bus Stand please follow the following sequence:

Bus Stand --> Niranjanpur Mandi (~ 3 KM) --> Rohan Motorts (~ 1 KM) --> Balliwala Chowk (~ 2 KM) ---> Ballupur Chowk (~ 2 KM) ---> IMA (~ 3 KM)---> Prem Nagar (~ 3 KM)---> Nanda Ki Chowki (~ 2 KM)---> Bidholi (~ 10 KM)----> UPES Campus