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| 1. Name of the Faculty: Adarsh Kumar | Course Code: CCVT 4010 |
| 2. Course : Cybersecurity (CSSF3021) | L: 36 |
| 3. Program : BTECH-AI/ML | T:NA |
| 4. Target : | P:24 C:NA |

COURSE PLAN

| | |
|---------|------------------|
| Target | 50% (marks) |
| Level-1 | 40% (population) |
| Level-2 | 50% (population) |
| Level-3 | 60% (population) |

1. Method of Evaluation

| UG | PG |
|----------------------------------|---|
| Quizzes/Tests, Assignments (30%) | Quizzes/Tests, Assignments, seminar (50%) |
| Mid Examination (20%) | End semester (50%) |
| End examination (50%) | |

2. Passing Criteria

| Scale | PG | UG |
|------------------------------|---|---|
| Out of 10 point scale | SGPA – “6.00” in each semester CGPA – “6.00” Min. Individual Course Grade – “C” Course Grade Point – “4.0” | SGPA – “5.0” in each semester CGPA – “5.0” Min. Individual Course Grade – “C” Course Grade Point – “4.0” |

*for PG, passing marks are 40/100 in a paper

*for UG, passing marks are 35/100 in a paper

3. Pedagogy

1. Presentations
2. Flipped Classroom sessions
3. Think-Pair-Share Activities
4. Video Lectures
5. Class Test
6. Quiz
7. Assignments
8. Digital and analog Presentations
9. Concept diary (needs to be maintained by students-short and concise notes which include course concepts that he/she has understood.)

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| Text Books | Web resources | Journals | Reference books |
|---|--|----------|--|
| <ol style="list-style-type: none">1. N. S. Godbole, Information Systems Security, Wiley, 2009.2. V. K. Jain, Cryptography and Network Security. KHANNA PUBLISHING HOUSE, 2013. | <ol style="list-style-type: none">1. https://owasp.org/ | | <ol style="list-style-type: none">1. P. V. K, CRYPTOGRAPHY AND INFORMATION SECURITY, THIRD EDITION. PHI Learning Pvt. Ltd., 2019.", PHI Learning |

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GUIDELINES TO STUDY THE SUBJECT

Instructions to Students:

1. Go through the 'Syllabus' in the Black Board section of the web-site(<https://learn.upes.ac.in>) in order to find out the Reading List.
2. Get your schedule and try to pace your studies as close to the timeline as possible.
3. Get your on-line lecture notes (Content, videos) at Lecture Notes section. These are our lecture notes. Make sure you use them during this course.
4. Check your blackboard regularly
5. Go through study material
6. Check mails and announcements on blackboard
7. Keep updated with the posts, assignments and examinations which shall be conducted on the blackboard
8. Be regular, so that you do not suffer in any way
9. **Cell Phones and other Electronic Communication Devices:** Cell phones and other electronic communication devices (such as Blackberries/Laptops) are not permitted in classes during Tests or the Mid/Final Examination. Such devices MUST be turned off in the class room.
10. **E-Mail and online learning tool:** Each student in the class should have an e-mail id and a pass word to access the LMS system regularly. Regularly, important information – Date of conducting class tests, guest lectures, via online learning tool. The best way to arrange meetings with us or ask specific questions is by email and prior appointment. All the assignments preferably should be uploaded on online learning tool. Various research papers/reference material will be mailed/uploaded on online learning platform time to time.
11. **Attendance:** Students are required to have minimum attendance of 75% in each subject. Students with less than said percentage shall NOT be allowed to appear in the end semester examination.

This much should be enough to get you organized and on your way to having a great semester! If you need us for anything, send your feedback through e-mail [to your concerned faculty](#). Please use an appropriate subject line to indicate your message details.

There will no doubt be many more activities in the coming weeks. So, to keep up to date with all the latest developments, please keep visiting this website regularly.

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RELATED OUTCOMES

1. The expected outcomes of the Program are:

| | |
|-----|--|
| PO1 | <i>Engineering knowledge:</i> Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems. |
| PO2 | <i>Problem analysis:</i> Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences |
| PO3 | <i>Design/development of solutions:</i> Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations. |
| PO4 | <i>Conduct investigations of complex problems:</i> Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions |
| PO5 | <i>Modern tool usage:</i> Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations. |
| PO6 | <i>The engineer and society:</i> Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice. |
| PO7 | <i>Environment and sustainability:</i> Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development. |
| PO8 | <i>Ethics:</i> Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice. |

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|------|--|
| PO9 | <i>Individual and team-work:</i> Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings. |
| PO10 | <i>Communication:</i> Communicate effectively on complex engineering activities with the engineering community and with society at-large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions. |
| PO11 | <i>Project management and finance:</i> Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments. |
| PO12 | <i>Life-long learning:</i> Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. |

2. The expected outcomes of the Specific Program are: (upto3)

| | |
|------|--|
| PSO1 | Perform system and application programming using computer system concepts, concepts of Data Structures, algorithm development, problem solving and optimizing techniques. |
| PSO2 | Apply software development and project management methodologies using concepts of front-end and back-end development and emerging technologies and platforms. |
| PSO3 | Ability to understand and apply Cloud Computing architecture for scalable, secure and dynamically provisioned business oriented environment with optimized performance tuning and data reliability |

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3. The expected outcomes of the Course are: (minimum 3 and maximum 6)

| | |
|------|--|
| CO 1 | Compare and classify various data security threats, threat techniques and countermeasures. |
| CO 2 | Employ and use emerging technologies and tools to aid IT Data Security |
| CO 3 | Recognize secure application development principles. |
| CO 4 | Describe input validation, authentication process, configuration management and parameter manipulation, exception management and session management. |

4. Co-Relationship Matrix

Indicate the relationships by 1- Slight (low) 2- Moderate (Medium) 3-Substantial (high)

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| CO1 | 1 | 2 | 2 | | 2 | | 2 | 2 | 2 | | 2 | 2 | 2 | 2 | 3 |
| CO2 | 1 | 2 | 2 | 2 | 2 | | 2 | 2 | 2 | | 2 | 2 | 2 | 2 | 3 |
| CO3 | 1 | 2 | | 2 | 2 | | 2 | 2 | 2 | | 2 | 2 | 2 | 2 | 3 |
| CO4 | 1 | | 2 | 2 | 2 | | 2 | 2 | 2 | | 2 | 2 | 2 | 2 | 3 |

5. Course outcomes assessment plan:

| components Course Outcomes | Assignment/Project | Test/Quiz | Mid Semester | End Semester | Any other |
|-------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| CO 1 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| CO 2 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| CO 3 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| CO 4 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

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|--------------------------|----|
| Total Class room | 36 |
| No. of Tests | 02 |
| No. of Quizzes | 02 |
| No. of Assignment | 02 |

One Session =60 minutes

EVALUATION & GRADING

Students will be evaluated based on the following 3 stages.

- | | | | |
|-----|----------------------|---|-----|
| 5.1 | Internal Assessment | - | 30% |
| 5.2 | Mid-term Examination | - | 20% |
| 5.2 | End term Examination | - | 50% |

INTERNAL ASSESSMENT: WEIGHTAGE – 30%

Internal Assessment shall be done based on the following:

| Assessment | Percentage |
|-------------------|-------------------|
| Assignment 1 & 2 | 40% |
| Quiz 1 and 2 | 60% |
| Total | 100% |

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BROAD PLAN OF COURSE COVERAGE

Course Activities:

| S. No. | Description | Planned | | | Remarks |
|--------|---|---------|----|-----------------|---------|
| | | From | To | No. of Sessions | |
| 1. | UNIT I: Introduction | 1 | 8 | 07 | |
| 2. | UNIT II: Malware and Vulnerability | 9 | 15 | 07 | |
| 3. | UNIT III: Cryptography and Cryptanalysis | 16 | 27 | 11 | |
| 4. | UNIT IV: Cyber Law-Basics | 28 | 30 | 09 | |

Sessions: Total No. of Instructional periods available for the course

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SESSION PLAN

| SESSIONS | TOPIC | Course Outcomes Addressed | Required Learning Resources (including media) | Assignment(s)/Quizzes/Tests |
|----------------|-------------------------------------|---------------------------|---|-----------------------------|
| 7 | UNIT -1: Introduction | | | |
| L ₁ | Introduction to Cyber Space | CO1 | Bryan Sullivan, Vincent Liu (2011). Web Application Security, A Beginner's Guide. McGraw-Hill Education. ISBN: 0071776168 | Assignment 1 |
| L ₂ | Introduction to Information Systems | | Bryan Sullivan, Vincent Liu (2011). Web Application Security, A Beginner's Guide. McGraw-Hill Education. ISBN: 0071776168 | |
| L ₃ | Need for Cyber Security | | https://permalink.lanl.gov/object/tr?what=info:lanl-repo/lareport/LA-UR-15-24600 | |
| L ₄ | Introduction to Cyber Attacks | | Bryan Sullivan, Vincent Liu (2011). Web Application Security, A Beginner's Guide. McGraw-Hill Education. ISBN: 0071776168 | |
| L ₅ | Introduction to Cyber Attacks | | Bryan Sullivan, Vincent Liu (2011). Web Application Security, A Beginner's Guide. | |

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|-----------------------|--|-----------------|---|--------|
| | | | McGraw-Hill Education. ISBN: 0071776168 | |
| L₆ | Classification of Cyber Attacks | | Bryan Sullivan, Vincent Liu (2011). Web Application Security, A Beginner's Guide. McGraw-Hill Education. ISBN: 0071776168 | |
| L₇ | Classification of Cyber Attacks | | | |
| L₈ | Classification of Cyber Attacks | | | |
| L₉ | Classification of Cyber Attacks | | | |
| 7 | UNIT 2: Malware and Vulnerability | | | |
| L₇ | Introduction, Disk Encryption, | | P. V. K, CRYPTOGRAPHY AND INFORMATION SECURITY, THIRD EDITION. PHI Learning Pvt. Ltd., 2019.”, PHI Learning | Quiz 1 |
| L₈ | Hardware based mechanisms for protecting data, Backups | CO1, CO2 | | |
| L₉ | Data masking | | https://www.owasp.org/index.php/Input_Validation_Cheat_Sheet | |
| L₁₀ | Data Erasure | | https://www.owasp.org/index.php/Input_Validation_Cheat_Sheet | |
| L₁₁ | Quiz and Class Test | | | |
| TEST 01 | | MID TERM | | |

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|------------|---|-----------------|---|---------------------|
| 11 | UNIT-3: Cryptography and Cryptanalysis | | | |
| L12 | Input Validation - Buffer overflow; cross-site scripting; | CO2 | https://www.owasp.org/index.php/Input_Validation_Cheat_Sheet | Assignment 2 |
| L13 | SQL injection; canonicalization, Sensitive information | | https://www.owasp.org/index.php/Top_10_2014-12_Insufficient_Authentication/Authorization | |
| L14 | Access sensitive data in storage; | | P. V. K, CRYPTOGRAPHY AND INFORMATION SECURITY, THIRD EDITION. PHI Learning Pvt. Ltd., 2019.”, PHI Learning | |
| L15 | Network eavesdropping; | | P. V. K, CRYPTOGRAPHY AND INFORMATION SECURITY, THIRD EDITION. PHI Learning Pvt. Ltd., 2019.”, PHI Learning | |
| L16 | Data tampering, Network eavesdropping; | | https://www.owasp.org/index.php/Top_10_2014-12_Insufficient_Authentication/Authorization | |
| L17 | Brute force attack; dictionary attacks; cookie replay; | CO1, CO2 | https://www.owasp.org/index.php/Input_Validation_Cheat_Sheet | |
| L18 | credential theft, Elevation of privilege; | CO2 | P. V. K, CRYPTOGRAPHY AND INFORMATION SECURITY, THIRD | |

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|-----|---|-----|---|--------------------|
| | | | EDITION. PHI Learning Pvt. Ltd., 2019.”, PHI Learning | |
| L19 | disclosure of confidential data; | CO2 | P. V. K, CRYPTOGRAPHY AND INFORMATION SECURITY, THIRD EDITION. PHI Learning Pvt. Ltd., 2019.”, PHI Learning | |
| L20 | data tampering; luring attacks; Phishing | | P. V. K, CRYPTOGRAPHY AND INFORMATION SECURITY, THIRD EDITION. PHI Learning Pvt. Ltd., 2019.”, PHI Learning | |
| 9 | Unit- 4: Cyber Law-Basics | | | |
| L21 | Unauthorized access to administration interfaces; unauthorized access to configuration stores | CO2 | https://www.sans.org/reading-room/whitepapers/analyst/security-configuration-management-demystified-35205 | Class Assignment 1 |
| L22 | Retrieval of clear text configuration data; | | https://www.owasp.org/index.php/Session_Management_Cheat_Sheet | |
| L23 | lack of individual accountability; | | P. V. K, CRYPTOGRAPHY AND INFORMATION SECURITY, THIRD EDITION. PHI Learning | |

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|------------|--|---------|--|--|
| | | | Pvt. Ltd., 2019.”, PHI Learning | |
| L24 | over-privileged process and service accounts. Hijacking; | | P. V. K, CRYPTOGRAPHY AND INFORMATION SECURITY, THIRD EDITION. PHI Learning Pvt. Ltd., 2019.”, PHI Learning | |
| L25 | session replay; man, in the middle | | P. V. K, CRYPTOGRAPHY AND INFORMATION SECURITY, THIRD EDITION. PHI Learning Pvt. Ltd., 2019.”, PHI Learning | |
| L26 | Cryptography Poor key generation or key management; weak or custom encryption. | CO3,CO4 | P. V. K, CRYPTOGRAPHY AND INFORMATION SECURITY, THIRD EDITION. PHI Learning Pvt. Ltd., 2019.”, PHI Learning | |
| L27 | Parameter manipulation Query string manipulation; | CO3,CO4 | | |
| L28 | Form field manipulation; cookie manipulation; HTTP header manipulation | CO3,CO4 | P. V. K, CRYPTOGRAPHY AND INFORMATION SECURITY, THIRD EDITION. PHI Learning Pvt. Ltd., 2019.”, PHI Learning | |

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| L29 | Exception management, | CO3,CO4 | P. V. K, CRYPTOGRAPHY AND INFORMATION SECURITY, THIRD EDITION. PHI Learning Pvt. Ltd., 2019.”, PHI Learning | |
| L30 | Information disclosure; denial of service | CO3,CO4 | P. V. K, CRYPTOGRAPHY AND INFORMATION SECURITY, THIRD EDITION. PHI Learning Pvt. Ltd., 2019.”, PHI Learning | Quiz 2 |
| END TERM EXAMINATION | | | | |