**Master of Engineering - ME (Cyber Security)**

**Course File**

|  |  |  |
| --- | --- | --- |
| **Course Name** | : | Web Application Security |
| **Course Code** | : | CYS 5204 |
| **Academic Year** | : | 2024 - 25 |
| **Semester** | : | I |
| **Name of the Course Coordinator** | : | Mrs. Keerthana B |
| **Name of the Program Coordinator** | : | Mrs. Keerthana B |

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| **Signature of Program Coordinator**  **with Date** | **Signature of Course Coordinator**  **with Date** |

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Program Education Objectives (PEOs)

The overall objectives of the Learning Outcomes-based Curriculum Framework (LOCF) for **ME (Cyber Security)**,program are as follows.

|  |  |
| --- | --- |
| **PEO No.** | **Education Objective** |
| **PEO 1** | To prepare students with the technical knowledge and skills needed to protect and defend computer systems, mobile devices, and networks. |
| **PEO 2** | To develop students’ skills who can plan, implement, and monitor cyber security mechanisms to help ensure the protection of information technology assets. |
| **PEO 3** | To develop students who can identify, analyse and remediate IT security breaches within the limits of cyber laws and ethical practices. |
| **PEO 4** | Possess analytical, communicative and leadership skills, and demonstrate the ability to work in multidisciplinary and multi-cultural environments. |
| **PEO 5** | Be Self-motivated and remain continuously employable by engaging in lifelong learning. |

Program Outcomes (POs)

By the end of the postgraduate program in **ME (Cyber Security)**, graduates will be able to:

|  |  |
| --- | --- |
| **PO1** | Independently carry out research /investigation and development work to solve practical problems. |
| **PO2** | Write and present a substantial technical report/document. |
| **PO3** | Demonstrate a degree of mastery over the area as per the specialization of the program. The mastery should be at a level higher than the requirements in the appropriate bachelor program. |
| **PO4** | Identify, Analyze and evaluate the cybersecurity needs of an organization. |
| **PO5** | Develop knowledge in Cybersecurity to Monitor, Prevent, Predict and Detect and countermeasure cyberattacks using tools and techniques using appropriate Security tools. |

# Course Plan

## Primary Information

|  |  |  |
| --- | --- | --- |
| **Course Name** | **:** | Cyber Security [CYS 5204] |
| **L*-*T*-*P-C** | **:** | 3-0-0-3 |
| **Contact Hours** | **:** | 36 Hours |
| **Pre-requisite** | **:** | Basic HTML |
| **Core/ PE/OE** | **:** | Core |

## Course Outcomes (COs), Program outcomes (POs) and Bloom’s Taxonomy Mapping

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CO** | **At the end of this course, the student should be able to:** | **No. of Contact Hours** | **Program Outcomes (PO’s)** | **BL** |
| CO1 | Understand the importance of security in web application | 6 | PO1 | 3 |
| CO2 | Launch attacks using Damn Vulnerable Web Application | 20 | PO3 | 4 |
| CO3 | Identify Vulnerabilities in the Web Server | 10 | PO4 | 5 |

## Assessment Plan

|  |  |  |  |
| --- | --- | --- | --- |
| **Components** | **Internal Test 1** | **Flexible Assessments** | **End semester/ Makeup examination** |
| **Duration** | 90 minutes | To be decided by the faculty. | 180 minutes |
| **Weightage** | 0.3 | 0.2 | 0.5 |
| **Typology of questions** | Applying; Analyzing. | Applying; Implementing,  Evaluating. | Applying; Analyzing; Evaluating. |
| **Pattern** | Answer all 5 questions of 10 marks each. Each question may have 2 to 3 parts of 3/4/5/6/7 marks. | **Assignment:** Identify the vulnerabilities present in the web applications | Answer all 10 full questions of 10 marks each. Each question may have 2 to 3 parts of 3/4/5/6/7 marks. |
| **Schedule** | As per academic calendar. | **Assignment submission:** March2025 | As per academic calendar. |
| **Topics covered** | Introduction –  Components of Web application  What can go wrong  Client side attacks | Client side and API security | Comprehensive examination covering the full syllabus. Students are expected to answer all questions. |

## Lesson Plan

|  |  |  |  |
| --- | --- | --- | --- |
| **L. No.** | **TOPICS** | |  | | --- | | **Course Outcome Addressed** | |
| L0 | Course delivery plan, Course assessment plan, Course outcomes, Program outcomes, CO-PO mapping, reference books | --- |
| L1 | Introduction to Web application Security |  |
| L2 | Components of Web application security – Basic Terminologies -I |  |
| L3 | Where it goes wrong in web application security – Post attack – preventive measure |  |
| L4 | Attack surface attack path and attack vector – Evolution of web |  |
| L5 | Tools used in identify vulnerabilities in the application |  |
| L6 | Basic Terminologies – II |  |
| L7 | Threat modeling |  |
| L8 | Threat modeling |  |
| L9 | Threat Modeling |  |
| L10 | Client Side – Information gathering |  |
| L11 | Client Side- Information gathering |  |
| L12 | Client Side – |  |
| L13 | Client Side - |  |
| L14 | Client Side – |  |
| L15 | Client Side – |  |
| L16 | Client Side – |  |
| L17 | OSWAP TOP 10 |  |
| L18 | OSWAP TOP 10 |  |
| L19 | OSWAP TOP 10 |  |
| L20 | OSWAP TOP 10 |  |
| IT1 |  |  |
| L21 | OSWAP TOP 10 |  |
| L22 | OSWAP TOP 10 |  |
| L23 | OSWAP TOP 10 |  |
| L24 | OSWAP TOP 10 |  |
| L25 | OSWAP TOP 10 |  |
| L26 | OSWAP TOP 10 |  |
| L27 | Web server Security |  |
| L28 | Web server Security |  |
| L29 | Web server Security |  |
| L30 | Web server Security |  |
| L31 | Web server Security |  |
| L32 | Web server Security |  |
| L33 | Web server Security |  |
| L34 | Web server Security |  |
| L35 | Web server Security |  |
| L36 | Web server Security |  |

## References

## Other Resources (Online, Text, Multimedia, etc.)

1. Web Resources: Blog, Online tools and cloud resources.
2. Journal Articles.

## Course Timetable

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1st Semester Cyber Security | | | | Room: LG1 LH 12 | | | | |
|  | 8-11 | 10-11 | 11-12 | 12-1 | 1-2 | 2:30-4 |  | 4-5 |
| MON | WAS Lab |  |  |  |  | WAS |  |  |
| TUE |  |  |  |  |  |  |  |  |
| WED |  |  |  |  |  |  | | |
| THU |  |  |  |  |  |  |  |  |
| FRI |  |  |  |  |  | WAS |  |  |
| SAT |  |  |  |  |  |  |  |  |

## Assessment Plan

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Cos** | | **Marks & Weightage** | | | |
| CO No. | CO Name | IT-1  (Max. 50) | Assignment  (Max. 20) | End Semester  (Max. 100) | CO wise  Weightage |
| CO1 | Understand the importance of security in web application | 10 | 4 | 20 | **0.20** |
| CO2 | Launch attacks using Damn Vulnerable Web Application | 40 | 12 | 50 | **0.61** |
| CO3 | Identify Vulnerabilities in the Web Server |  | 4 | 30 | **0.19** |
|  | **Marks (weightage)** | **0.3** | **0.2** | **0.5** | **1.0** |

Note:

* In-semester Assessment is considered as the Internal Assessment (IA) in this course for 50 marks, which includes the performances in class participation, assignment work, class tests, mid-term tests, quizzes etc.
* End-semester examination (ESE) for this course is conducted for a maximum of 100 and the same will be scaled down to 50.
* End-semester marks for a maximum of 50 and IA marks for a maximum of 50 are added for a maximum of 100 marks to decide upon the grade in this course.

Weightage for CO1 = (IT1 marks for CO1 / 2.5 + Assignment marks for CO1 + ESE marks for CO1 / 2)/100

= (25/2.5 + 0 + 0 + 20/ 2)/100 = 0.2

## Assessment Details

The assessment tools to be used for the Current Academic Year (CAY) are as follows:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **SI. No.** | **Tools** | **Weightage** | **Frequency** | **Details of Measurement (Weightage/Rubrics/Duration, etc.)** |
| 1 | Internal Test | 0.3 | 2 | * Performance is measured using internal test attainment level. * Reference: question paper and answer scheme. * Each internal test is assessed for a maximum of 50 marks and scaled down to 40 marks. |
| 2 | Assignments | 0.2 | 5 | * Performance is measured using assignments/quiz attainment level. * Assignments/quiz are evaluated for a maximum of 10 marks. |
| 3 | End Semester | 0.5 | 1 | * Performance is measured using ESE attainment level. * Reference: question paper and answer scheme. * ESE is assessed for a maximum of 100 marks and scaled down to 50 marks. |

## Course Articulation Matrix

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CO** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** |
| CO1 | \* |  |  |  |  |
| CO2 |  |  | **\*** |  |  |
| CO3 |  |  |  | **\*** |  |
| Average Articulation Level |  |  |  |  |  |