|  |  |
| --- | --- |
| ***Course Title: AUTOMOTIVE CYBER SECURITY*** | ***Course Code: 22MSCS313*** |
| ***Credits (L:T:P): 4:0:0*** | ***Contact Hours(L:T:P: 52:0:0)*** |
| ***Type of Course: Lecture, Practical*** | ***Category: Professional Core Course*** |
| ***CIE Marks: 40*** | ***SEE Marks: 100*** |

**Pre-requisite:**

**Course Outcomes:** After completing this course, students should be able to:

|  |  |
| --- | --- |
| CO-1 | Identify the security requirements in IT/computer & embedded systems and understand the importance of security system in automotive domain. |
| CO-2 | Awareness about security architecture, HW & SW solutions for security challenges in automotive domain. |
| CO-3 | Able to analyze & model the security feature use cases |
| CO-4 | Practice analyzing the threats & risks in security feature requirement use cases. |

|  |  |  |
| --- | --- | --- |
| **Unit No.** | **Course Content** | **No. of Hours** |
| 1 | Introduction to Cryptography and related Infrastructure; Motivation & Security Basics: Current trends & Development, Safety and Security,  Cryptography Concepts: Encoding, Encryption, Hash, Security services, Examples of Algorithm (AES 128, RSA), Signature & Encryption, Symmetric & Asymmetric signatures.  Public Key Infrastructure: Digital Certificate, Functions of PKI, Certifying Authority, Hierarchy of Certifying Authority | SJCE  15 |
| 2 | Layered automotive security, CIA Triad.  Security Architecture: Software and Hardware Solutions - Introduction to Hardware Security Module (HSM), HSM and Software Crypto Libraries, Software & Hardware Encryption.  Autosar Software Architecture overview, Introduction to Autosar Communication stack, Crypto stack & Diagnostic Stack. | 10 Bosch |

|  |  |  |
| --- | --- | --- |
| 3 | Automotive Security Features: Challenge- Response Protocol, Secure Access, Secure Flashing. Secure On-Board Communication, Secure Boot, Secure storage, Secure Logging.  **Case studies will be provided by BGSW and Presentation to be provided by students.** | 6 +**3**  Bosch |
| 4 | Security Functional Testing- Overview; Security Features Validation: Penetration Testing-Overview, Methodology, Types of Penetration Testing.  Threat and Risk Analysis in Security  **Case studies will be provided by BGSW and Presentation to be provided by students.** | 4 + **3**  **Bosch** |
| 5 | **Project work on development of any security feature prototype. For ex: Use Oracle/SQL Server for PKI, Develop an application on Linux or In any user friendly environment and Execution**  Mentoring will be provided by BGSW. The Project will be carried in the College Lab. | SJCE  12 |

**Text Books:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Sl. No.** | **Author/s** | **Title** | **Publisher Details** |
| 1 | William Stallings | Cryptography and network security principles and practice fifth edition, | Pearson Education |
| 2 | Kerstin Lemke, Christof Paar, Marko Wolf; | Embedded Security in Cars; | Springer Edition. |

**Reference Book:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Sl. No.** | **Author/s** | **Title** | **Publisher Details** |
| 1 | Kleidermacher David | Embedded Systems Security | Elsevier Science & Technology |
| 2. | [Nina Godbole](https://www.amazon.in/s/ref=dp_byline_sr_book_1?ie=UTF8&field-author=Nina+Godbole&search-alias=stripbooks), [Sunit Belapure](https://www.amazon.in/s/ref=dp_byline_sr_book_2?ie=UTF8&field-author=Sunit+Belapure&search-alias=stripbooks) | Cyber Security | Wiley |
| 3 | Web Resource | https://link.springer.com/chapter/10.1007/978-981-16-2217-5\_3 |  |