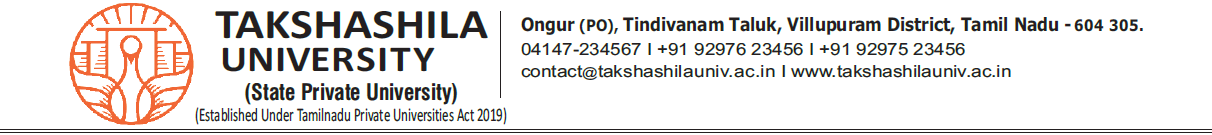
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**SCHOOL OF COMPUTER SCIENCE**

**LESSON PLAN FOR THEORY COURSE**

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| --- | --- | --- | --- | --- | --- | --- |
|  | | | | **Regulation** | | **2024** |
| **Name of the Faculty** | Bharathidasan.R | | | | | |
| **Designation** | Assistant Professor | **Department** | Computer Science | | | |
| **Course Name** | Cloud Security | | **Course Code** | | P24CAT373 | |
| **Year / Semester / Section** | II | III | A Section | | | |
| **Course Category** | Theory | **Credits** | 4 | | | |
| **Periods (Hours) per week** | **Lectures** | 4 | | | | |
| **Tutorials** | 0 | | | | |

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| --- | --- | --- |
| Evaluation System | **Theory Examination** | |
| **Method Assessment** | **Marks** |
| Internal Assessment Mark | 20 |
| Assignment Mark | 05 |
| Technical Aptitude (MCQ) | 05 |
| Seminar / Presentation | 05 |
| Attendance Mark | 05 |
| End Semester Examination | 60 |
| Total Marks | 100 |

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| --- | --- | --- | --- |
| Time Table | **Day** | **Period** | **Time** |
| I | 2 | 10.20 am to 11.10 am |
| II | - | --- |
| III | - | --- |
| IV | 2 | 10.20 am to 11.10 am |
| V | 5 | 01.40 pm to 02.20 pm |
| VI | 7 | 03.10 pm to 04.00 pm |

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| --- | --- | --- | --- | --- | --- | --- |
| **P24CAT373** | **Cloud Security** | **L** | **T** | **P** | **C** | **Hrs** |
| **3** | **0** | **0** | **3** | **45** |

**Unit I: Introduction to Virtualization Security** 9 Hrs.

Introduction to Virtualization, impact and business benefits of Virtualization in the context of Security, Risks of Virtualization including attacks on Virtualization infrastructure, Hyper jacking and Virtual Machine jumping. Hyper jacking attacks like Blue Pill, Sub Virt, Vitriol, attacks on Virtualization features and compliance and Management challenges. Strategies and counter measures for addressing Virtualization risks, securing hypervisors, virtual machines threats, vulnerabilities and mitigation measures

**Unit II: Introduction to Cloud Security** 9 Hrs.

Introduction to Cloud Computing, various Cloud Delivery models including Software as a Service (SaaS), Platform as a Service (PaaS) and Infrastructure as a Service (IaaS) in the context of Security, Cloud deployment models – public, private and hybrid in the context of Security, Trusted Cloud Initiative (TCI) and Cloud Trust Protocol (CTP), Transparency as a Service (TaaS) and Security as a Service (SecaaS), Cloud Security, Incident and Response (Cloud SIRT), Cloud Data Governance and Governance, Risk and Compliance (GRC) Stack, top threats to Cloud Security, comparison of traditional IT and Cloud Security.

**Unit III: Cloud Security Architecture** 9 Hrs.

Architectural considerations, Cloud storage and data security, identity management and access control, autonomic security, encryption and key strategies, secure connection, Privacy in Cloud, architecture changes for different Cloud deployment models, Business Continuity Management and Disaster Recovery in the Cloud, OpenStack Cloud Security, Cloud forensics

**Unit IV: Cloud Security Controls** 9 Hrs.

Introduction to Cloud Controls Matrix, 13 domains of Security controls, fundamental security principles, deterrent, preventive, detective and corrective security controls for Cloud computing, assessing security risk of a cloud provider

**Unit V: Security of Cloud Services** 9 Hrs

Cloud Platform and Infrastructure security-physical environment, networking, computing, virtualization, storage, risks and countermeasures, Cloud application security, Cloud secure development lifecycle, Cloud application architecture, multi-factor authentication, SSO, Understanding legal challenges involved in Cloud, liability, copyright, data protection, IPR, data portability, inter-country legal frameworks, personal data protection and privacy, data controller and processor, contracts, provider’s insolvency risk

**TEXT BOOKS:**

1. Gautam Shroff, Enterprise Cloud Computing Technology Architecture Applications [ISBN: 978-0521137355]

2. Virtualization Security: Protecting Virtualized Environments by Dave Shackleford, Sybex (4 December 2012)

3. OpenStack Cloud Security by Fabio Alessandro Locati, Packt Publishing Limited (28 July 2015)

4. Cloud Security – A comprehensive Guide to Secure Cloud Computing by Ronald L. Krutz and Russel Dean Vines, Wiley, 2010

**REFERENCES:**

1. Toby Velte, Anthony Velte, Robert Elsenpeter, Cloud Computing, A Practical Approach [ISBN: 0071626948]

2. Tim Mather, Subra Kumaraswamy, Shahed Latif, Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance [ISBN: 0596802765]

3. Ronald L. Krutz, Russell Dean Vines, Cloud Security [ISBN: 0470589876]

**Course Objectives:**

* To introduce the fundamentals of virtualization and its security implications
* To provide an in-depth understanding of cloud computing models
* To familiarize students with cloud security architecture
* To explain cloud security control frameworks and methodologies
* To equip students with the knowledge of securing cloud services
* To prepare students for real-world challenges in cloud and virtualization security

**Course Outcomes:**

On successful completion of the course, students will be able to:

CO1: Understand the overview of incident response.

CO2: Able to Plan and prepare for all stages of an investigation - detection, initial response and management interaction

CO3: Analyze and Investigate web server attacks, DNS attacks and router attacks and also can learn the importance of evidence handling and storage

CO4: Able Monitor network traffic and detect illicit servers and covert channels

CO5: Understand the basics elements of network forensics

**TEACHING METHODS**

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| **BB** – Black Board  **PPT** – Power Point  **Demo** – Demonstration  **MM** – Model Making and Demo | **VL** – Video Lecture  **AN** – Animation  **GL** – Guest Lecture  **PD** – Panel Discussion | **DB** – Debate  **SS** – Student Seminar  **CS** – Case Studies  **QZ** – Quiz |

**Books**

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| --- | --- | --- |
| **TB1** – Text Book 1 | **RB1** – Reference Book 1  **RB2** – Reference Book 2 | **WR1** – Web Reference 1  **WR2** – Web Reference 2 |

**Lesson Plan**

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| **UNIT–I : Introduction to Virtualization Security** | | | | | |
| Lecture No | Dates | | Topics Planned to be Covered | Teaching Method | Books covered |
| Scheduled Date | Conducted Date |
| L1 | 21.07.25 |  | Introduction to Virtualization | BB | T2 |
| L2 | 22.07.25 |  | Impact and business benefits of Virtualization | BB | T2 |
| L3 | 23.07.25 |  | Risks of Virtualization | BB | T2 |
| L4 | 24.07.25 |  | Virtualization infrastructure | PPT | T2 |
| L5 | 25.07.25 |  | Hyper jacking and Virtual Machine jumping | BB | T2 |
| L6 | 26.07.25 |  | Hyper jacking attacks like Blue Pill, Sub Virt, Vitriol, attacks | BB | T2 |
| L7 | 28.07.25 |  | Hyper jacking attacks like Blue Pill, Sub Virt, Vitriol, attacks | BB | T2 |
| L8 | 29.07.25 |  | Virtualization features and compliance and Management challenges | BB | T2 |
| L9 | 30.07.25 |  | Strategies and counter measures for addressing Virtualization risks | BB | T2 |
| L10 | 01.08.25 |  | Securing hypervisors | BB | T2 |
| L11 | 04.08.25 |  | Virtual machines threats | BB | T2 |
| L12 | 06.08.25 |  | Vulnerabilities and mitigation measures | BB | T2 |

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| **UNIT–II : Introduction to Cloud Security** | | | | | | |
| Lecture No | | Dates | | Topics Planned to be Covered | Teaching Method | Books covered |
| Scheduled Date | Conducted Date |
| L13 | | 07.08.25 |  | Introduction to Cloud Computing | PPT | T1 |
| L14 | | 08.08.25 |  | Various Cloud Delivery models | BB | T1 |
| L15 | | 09.08.25 |  | Software as a Service (SaaS) | BB | T1 |
| L16 | | 11.08.25 |  | Platform as a Service (PaaS) | BB | T1 |
| L17 | | 12.08.25 |  | Infrastructure as a Service (IaaS) | BB | T1 |
| L18 | | 13.08.25 |  | Cloud deployment models | PPT | T1 |
| L19 | | 14.08.25 |  | Trusted Cloud Initiative (TCI) | BB | T1 |
| L20 | | 18.08.25 |  | Cloud Trust Protocol (CTP) | BB | T1 |
| L21 | | 19.08.25 |  | Transparency as a Service (TaaS) and (SecaaS) | PPT | T1 |
| L22 | | 20.08.25 |  | Cloud Security, Incident and Response | BB | T1 |
| L23 | | 21.08.25 |  | Cloud Data Governance and Governance, Risk and Compliance (GRC) | BB | T1 |
| L24 | | 22.08.25 |  | Top threats to Cloud Security, comparison of traditional IT | BB | T1 |
|  | |  |  |  |  |  |
| **UNIT–III : Cloud Security Architecture** | | | | | | |
| Lecture No | Dates | | | Topics Planned to be Covered | Teaching Method | Books covered |
| Scheduled Date | | Conducted Date |
| L25 | 23.08.25 | |  | Architectural considerations | BB | T1 |
| L26 | 25.08.25 | |  | Cloud storage and data security | BB | T1 |
| L27 | 26.08.25 | |  | Identity management and access control | BB | T1 |
| L28 | 28.08.25 | |  | Autonomic security | BB | T1 |
| L29 | 29.08.25 | |  | Encryption and key strategies, | BB | T1 |
| L30 | 30.08.25 | |  | Secure connection | BB | T1 |
| L31 | 08.09.25 | |  | Privacy in Cloud | BB | T1 |
| L32 | 09.09.25 | |  | architecture changes for different Cloud deployment models | BB | T1 |
| L33 | 10.09.25 | |  | Business Continuity Management | PPT | T1 |
| L34 | 11.09.25 | |  | Disaster Recovery in the Cloud | PPT | T1 |
| L35 | 12.09.25 | |  | OpenStack Cloud Security | PPT | T1 |
| L36 | 13.09.25 | |  | Cloud forensics | PPT | T1 |

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| **UNIT–IV : Cloud Security Controls** | | | | | |
| Lecture No | Dates | | Topics Planned to be Covered | Teaching Method | Books covered |
| Scheduled Date | Conducted Date |
| L37 | 15.09.25 |  | Introduction to Cloud Controls Matrix | BB | T3 |
| L38 | 16.09.25 |  | Introduction to Cloud Controls Matrix | BB | T3 |
| L39 | 17.09.25 |  | 13 domains of Security controls | BB | T3 |
| L40 | 18.09.25 |  | 13 domains of Security controls | BB | T3 |
| L41 | 19.09.25 |  | Fundamental security principles | BB | T3 |
| L42 | 22.09.25 |  | Fundamental security principles | BB | T3 |
| L43 | 23.09.25 |  | Deterrent | BB | T3 |
| L44 | 24.09.25 |  | Preventive | BB | T3 |
| L45 | 25.09.25 |  | Detective | BB | T3 |
| L46 | 26.09.25 |  | Corrective security controls | BB | T3 |
| L47 | 27.09.25 |  | Cloud Providers | BB | T3 |
| L48 | 29.09.25 |  | Assessing security risk of a cloud provider | BB | T3 |

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| **UNIT–V : Security of Cloud Services** | | | | | |
| Lecture No | Dates | | Topics Planned to be Covered | Teaching Method | Books covered |
| Scheduled Date | Conducted Date |
| L49 | 03.10.25 |  | Cloud Platform and Infrastructure security-physical environment | BB | T4 |
| L50 | 06.10.25 |  | Networking | PPT | T4 |
| L51 | 07.10.25 |  | Computing, virtualization | BB | T4 |
| L52 | 13.10.25 |  | Storage, risks and countermeasure | BB | T4 |
| L53 | 14.10.25 |  | Cloud application security | PPT | T4 |
| L54 | 15.10.25 |  | Cloud secure development lifecycle | BB | T4 |
| L55 | 16.10.25 |  | Cloud application architecture, multi-factor authentication | BB | T4 |
| L56 | 17.10.25 |  | Understanding legal challenges involved in Cloud | BB | T4 |
| L57 | 22.10.25 |  | Liability, copyright, data protection, IPR, data portability | BB | T4 |
| L58 | 23.10.25 |  | Inter-country legal frameworks | BB | T4 |
| L59 | 24.10.25 |  | Personal data protection and privacy | BB | T4 |
| L60 | 25.10.25 |  | Data controller and processor | BB | T4 |

**Question Paper Pattern**

1. Continuous Internal Assessment

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| --- | --- | --- | --- |
| **Part A** | **Part B** | **Part C** | **Total Marks** |
| 5 x 2 = 10 | 3 x 10 = 30 | 1 x 10 = 10 | 50 |

1. End Semester Examination

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| **Part A** | **Part B** | **Part C** | **Total Marks** |
| 10 x 2 = 20 | 6 x 10 = 60 | 2 x 10 = 20 | 100 |

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|  | **Faculty Name / Designation** | **Signature** |
| **Prepared by** | Mr. R. BHARATHIDASAN, ASSISTANT PROFESSOR |  |
| **Verified by** | Dr. T.VIJAYAKUMAR, ASSISTANT PROFESSOR |  |
| **Approved by** | Dr. S. DEEPA, DEAN FSC & I/C FHSS |  |