# NEW JERSEY INSTITUTE OF TECHNOLOGY

# Department of Engineering Technology

**Title** – Introduction to Security – Medical Devices

**Course** # - MIT 231

**Pre-Requisites** - An Introduction to Computer Programming course CS 100 or CS 106 or CS 113 or CS 115

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**Text:**

* Official (ISC)2 Guide to the HCISPP CBK ((ISC)2 Press) 1st Edition ISBN-13: 978-1482262773 , ISBN-10: 1482262770 ( Optional)
* Security and Privacy for Implantable Medical Devices - ISBN-13: 978-1461416739 , ISBN-10: 1461416736 ( Optional)
* CCNA Security 210-260 Certification Guide (Optional)

**Course Description** - Medical devices and systems are uniquely vulnerable to hacking and intrusion due to the nature of architecture: i.e. usually a dedicated device designed to solve a limited medical application such as an infusion pump that delivers medications in measured dosages. These systems rarely have more than a minimal computer footprint with limited or no Operating system, i.e. a dedicated controller, and are usually updated periodically wirelessly. Our increased reliance on life sustaining technology required that computer professionals and engineers are educated on the evolving issues and solutions to these potentially life-threatening dangers.

**Purpose** - As Medical Technology becomes ever more pervasive in the treatment and sustaining our lives, the threat to malicious intrusion of the devices grows daily. Computer Scientists and designers must understand and design systems that are as secure as possible.

**Topics Covered**

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| **Course** | **MIT231 - Introduction to Security - Medical Devices** | |
| **Week** | **Topics Covered** | **Sub Topics** |
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| 1/2 | Healthcare Industry | ■ Understand the Healthcare Environment  ¤ Types of Organizations in the Healthcare Sector  ¤ Health Information Technology  ¤ Health Insurance  ¤ Coding  ¤ Billing, Payment, and Reimbursement  ¤ Workflow Management  ¤ Regulatory Environment  ¤ Patient Care and Safety  ¤ Clinical Research  ■ Understand External Third Party  ¤ Vendors  ¤ Business Partners  ¤ Data Sharing  ¤ Regulators  ■ Understand Foundational Health Data Management Processes  ¤ Information Flow and Life Cycle in the Healthcare Environments  ¤ Health Data Characterization  ¤ Data Interoperability and Exchange  ¤ Legal Medical Records |
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| 2 | Introduction to Networking | What does IT mean to you ?  What is the Network  What is the Internet ?  What is Cloud ?  Types of Networks |
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| 3/4 | Healthcare Security Overview | Security Objectives and Attributes  ¤ Confidentiality  ¤ Integrity  ¤ Availability  General Security Definitions and Concepts  ¤ Access Control ¤ Data Encryption  ¤ Training and Awareness  ¤ Logging and Monitoring  ¤ Vulnerability Management ¤ Systems Recovery  ¤ Segregation of Duties  ¤ Least Privilege (Need to Know)  ¤ Business Continuity  ¤ Data Retention and Destruction |
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| 5 | Introduction to Wireless | Why Wireless  Wireless Organization  Wireless fundamentals  Understanding Frequency  Wireless Security |
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| 6/7 | Segmentation - Medical Devices | Factors Governing Segmentation  Segmentation Framework  Identity & Trust  Visibility  Policy Enforcement – Traditional Segmentation  Software Defined Micro Segmentation  Trust Sec and Fabric Integration |
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| 8 | Multi-Factor Authentication in Healthcare | Healthcare Security Challenges  Healthcare Use Cases  MFA ?  High Level MFA Architecture  MFA Demo |
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| 9/10 | Architecture - Securing Wireless Infusion Pumps | Basic System  Data Flow  CyberSecurity Controls  Pump Controls  Enterprise Level Controls  Final Architecture |
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| 11/12 | Cloud Security & Monitoring | Cloud Security Challenge  Public Cloud Security  SaaS Security |