

Course No	Course Title	Hours/Week	Credits
		Theory + Lab	
SWE 425	Software Project Management	2 + 0	2
SWE 426	Software Project Management Lab	0 + 2	1
SWE 429	Information and Network Security	2 + 0	2
SWE 430	Information and Network Security Lab	0 + 3	1.5
SWE 431	Human Computer Interaction	2 + 0	2
SWE 432	Human Computer Interaction Lab	0 + 3	1.5
SWE 4**	Option	3 + 0	3
SWE 4**	Option Lab	0 + 3	1.5
SWE 450	Thesis/Project	0 + 8	4
SWE 460	Comprehensive Viva Voce	---	1
	Total	10 + 19 = 29	19.5

SWE 425 SOFTWARE PROJECT MANAGEMENT

2 Hours/Week, 2 Credits

Planning and managing of software development projects. Software process models, ISO 9000, SEI's Capability Maturity Model, continuous process improvement. Planning, scheduling, tracking, cost estimation, risk management, configuration management

Text:

1. Quality Software Project Management by Linda I. Safer, Donald F. Shafer, Robert T. Futrell

SWE 426 SOFTWARE PROJECT MANAGEMENT LAB

2 Hours/Week, 1 Credits

Practical implementation of various Software Project management tasks based on SWE 425.

SWE 429 INFORMATION AND NETWORK SECURITY

2 Hours/Week, 2 Credits

Introduction: Confidentiality, Integrity, Availability, Security policies, Security mechanisms, Assurance. **Basic Cryptography:** Historical background, Transposition/Substitution, Caesar Cipher, Symmetric and Asymmetric cryptoprimitives, and Hash functions. **Secret Key Cryptography:** Data Encryption Standard (DES), Encrypting large messages (ECB, CBC, OFB, CFB, CTR), Multiple Encryption DES (EDE). **Message Digests:** Strong and weak collision resistance, the Birthday Paradox, MD5, SHA-1. **Public Key Cryptography:** Euclidean algorithm, Euler Theorem, Fermat Theorem, RSA, Selection of public and private keys. **Authentication:** Security Handshake pitfalls. **Trusted Intermediaries:** Public Key infrastructures, Certification authorities and key distribution centers, Kerberos. **Real-time Communication Security:** Introduction to TCP/IP protocol stack, Implementation layers for security protocols and implications, IPsec: AH and ESP, IPsec: IKE, SSL/TLS. Electronic Mail Security, DNS security, Firewalls and Web Security. **Network Security:** Security requirements and attacks, Privacy with conventional encryption, Message Authentication and Hash functions, Public-key encryption and digital signatures, Ipv4 and Ipv6 security.

Text:

1. Network Security Through Data Analysis: Building Situational Awareness—Michael Collins

Reference:

1. Data Communications and Network Security—Houston Carr, Charles Snyder
2. Innovations for Requirement Analysis—Barbara Paech, Craig Martell

SWE 430 INFORMATION AND NETWORK SECURITY LAB

3 Hours/Week, 1.5 Credit

Analysis of basic cryptography algorithms. Using a Crypto tool, demonstrate Asymmetric and Symmetric Crypto Algorithm, Hash and Digital/PKI signatures. Getting familiar with port scanning using a port scanner tool. Examining SSL using Wireshark. Examining an Intrusion Detection System using SNORT or any other tool. Studying Firewall.

SWE 431 HUMAN COMPUTER INTERACTION

3 hours/week, 3.0 credits

Foundations of Human-Computer Interaction (Human Capabilities, The Computer, The Interaction, Paradigms)
The Design Process (Interaction Design Basics, HCI in the Software Process, Design Rules, Universal Design)
Implementation Support (Implementation Tools)
Evaluation and User Support (Evaluation, User Support)
Users Models (Cognitive Models, Socio-organizational Issues and Stakeholder Requirements)
Task Models and Dialogs (Analyzing Tasks, Dialog Notations and Design)
Groupware, Ubiquitous Computing, Virtual and Augmented Reality, Hypertext and Multimedia (Groupware and Computer-supported Collaborative Work, Ubiquitous Computing, Virtual Reality and Augmented Reality, Hypertext, Multimedia and the World Wide Web)

Text book:

1. Dix A. et al., Human-Computer Interaction. Harlow, England: Prentice Hall, 2004, ISBN-10: 0130461091
Yvonne Rogers, Helen Sharp, Jenny Preece, Interaction Design: Beyond Human Computer Interaction, 3rd Edition, Wiley, 2011, ISBN-10: 0470665769

SWE 432 HUMAN COMPUTER INTERACTION LAB

3 hours/week, 1.5 credits

The laboratory works will be based on theory classes where several programming exercises will need to be performed

SWE 450 THESIS/PROJECT

8 Hours/Week, 4 Credits

Project work based on all major courses.

SWE 460 COMPREHENSIVE VIVA VOCE

Optional Courses:

SWE 423 COMPUTER GRAPHICS AND IMAGE PROCESSING

3 Hours/Week, 3 Credits

Computer Graphics Programming: OpenGL. **Camera Analogy:** Viewing, Windowing, Clipping. **Projective Transformation(Ray-tracing):** Orthogonal Projection, Perspective Projection, **Vector:** Normal Vector, View Vector, **Matrix:** 2D and 3D Rotation and Translation Matrix, **Raster Graphics:** Line Drawing, Anti-aliasing, Polygon Filling Algorithms, **Hidden Surface Removal:** z-buffering, **Lighting and Surface Property:** Diffused Light, Ambient Light, Specular Light, Lighting Models for reflection, **Shading:** Flat Shading, Lambert Shading, Phong Shading, **Texture Mapping:** Texture Fundamentals, **Animation:** Real time animation. **Image Processing:** Image Fundamentals, **Image Enhancement:** Background, Enhancement by Point-Processing, Spatial Filtering, Enhancement in Frequency Domain, Color Image Processing. **Image Restoration:** Degradation Model, Diagonalization of Circulant and Block-Circulant Matrices, Algebraic Approach to Restoration, Inverse Filtering, Geometric Transformation. **Image Segmentation:** Detection of Discontinuities, Edge Linking and Boundary Detection, Thresholding, Region-Oriented Segmentation, The use of Motion in Segmentation. **Image Compression|.**

Text:

1. **Computer Graphics: Principles and Practice**, Folley, Van Dam, Feiner, Hughes,
2. **Computer Graphics: A Programming Approach:** Steven and Harrington.

Reference:

OpenGL(r) 1.2 Programming Guide, Third Edition: The Official Guide to Learning OpenGL, Version 1.2: by Mason Woo, Jackie Neider, Tom David, Dave Shreiner, OpenGL Architecture Review Board, Tom Davis, Dave Shreiner.

Graphics Programming in C: Roger T. Stevens.

Texture and Modeling: by David S. Ebert.

Digital Image Processing – Rafael C. Gonzalez and Richard E. Woods, Pearson Education Asia.

Non-Linear Digital Filter: Principles and Applications – I. Pitas and A. N. Venetsanopoulos, Kluwer Academic Publications.

SWE 424 COMPUTER GRAPHICS AND IMAGE PROCESSING LAB

3 Hours/Week, 1.5 Credits

Tool to use for lab: OpenGL, Line Drawing: Bresenham's, Region Filling: Scan Line Algorithm, Transformation: 2D and 3D translation, Rotation, Scaling, Clipping: Line and Polygon, Projection: Perspective and Parallel, Animation: Morphing