

## DESCRIPTION OF IEM COURSES

Year	Course Code	Course Title	Acad Units	Pre-Requisite	Contact Hours	Course Description
1	HW110	EFFECTIVE COMMUNICATION	2.0	Nil	Tut: 24 hrs	Communication process. Written communication. Oral presentation skills. Interpersonal skills.
1	IM1001	DATA STRUCTURES AND ALGORITHMS	3.0	Nil	Lec: 26 hrs Tut: 13 hrs	Introduction. Principles of algorithm analysis. Data structures. Searching. Sorting. Algorithm design techniques
1	IM1002	ANALOG ELECTRONICS	3.0	Nil	Lec: 26 hrs Tut: 13 hrs	Diode circuit analysis. Bipolar junction transistors. MOSFET devices. Small-signal amplifiers. Differential and multistage amplifiers. Frequency response. Operational amplifiers.
1	IM1003	OBJECT-ORIENTED PROGRAMMING	3.0	Nil	Lec: 26 hrs Tut: 13 hrs	Introduction to OOP. OOP concepts and programming. Graphical user interface programming.
1	IM1004	DIGITAL ELECTRONICS	3.0	Nil	Lec: 26 hrs Tut: 13 hrs	Number Systems and Logic Gates. Boolean algebra and Logic Minimization. Combinational logic design and MSI digital devices. Sequential Logic Elements. Synchronous sequential logic circuits. Programmable logic devices and memories.
1	IM1006	MATHEMATICS 1	3.0	Nil	Lec: 26 hrs Tut: 13 hrs	Complex numbers, vectors and matrices. Limits and continuity of functions. Derivatives. Applications of derivatives. Integration. Integration methods. Applications of integration.
1	IM1007	MATHEMATICS 2	3.0	Nil	Lec: 26 hrs Tut: 13 hrs	Partial differentiation. Multiple integrals. Sequences and series. First order differential equations. Second order differential equations.
1	IM1008	COMPUTING	3.0	Nil	Lec: 26 hrs Tut & Lab: 24 hrs	Introduction to computers. C language fundamentals. Flow of control. Functions and libraries. Arrays. Basic file processing. Structured programming and quality of programs. Case studies in engineering Applications.
2	HW210	TECHNICAL COMMUNICATION	2.0	Nil	Tut: 24 hrs	Principles of technical communication. Conveying technical information in writing and orally. Types of technical reports. Technical writing style.
2	IM1090	FOUNDATION PHYSICS	3.0	GCE 'O' Level Physics	Lec: 26 hrs Tut: 13 hrs	Kinematics. Dynamics. Oscillations and waves. Physics of fluids. Temperature and heat. Electricity. Magnetism and electromagnetism.
2	IM1091	ENGINEERING PHYSICS	4.0	FE0001	Lec: 39 hrs Tut: 13 hrs	Rotational Dynamics. Oscillations and Wave Motion. Optics. Quantum Physics. Electricity. Magnetism.
2	IM1092	BASIC ENGINEERING MATHEMATICS	3.0	Nil	Lec: 26 hrs Tut: 13 hrs	Differentiation and Integration. Ordinary Differential Equations. Partial Differentiation. Multiple Integrals. Infinite Sequences and Series. Vectors.

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2	IM2001	SOFTWARE ENGINEERING	3.0	Nil	Lec: 26 hrs Tut: 13 hrs	Introduction to software engineering. Software project management. Software requirements and specifications. Software design. Software testing and maintenance.
2	IM2002	MICROPROCESSORS	3.0	Nil	Lec: 26 hrs Tut: 13 hrs	Microprocessor fundamentals. Assembly language programming. I/O interfacing. Protected mode operation.
2	IM2003	COMPUTER COMMUNICATIONS	3.0	Nil	Lec: 26 hrs Tut: 13 hrs	Introduction to computer communications. Data Communications Fundamentals. Data Link Control. Local Area Networks. Internetworking.
2	IM2004	SIGNALS AND SYSTEMS	3.0	IM1006 & IM1007	Lec: 26 hrs Tut: 13 hrs	Signals and Systems. Linear Time-Invariant Systems. Fourier Series and Fourier Transform. Discrete-time Fourier Transform. Sampling. Modulation.
2	IM2006	ENGINEERING MATHEMATICS I	4.0	IM1007	Lec: 39 hrs Tut: 13 hrs	Fourier Analysis. Laplace Transform. Partial Differential Equations. Numerical Methods. Probability. Mathematical Statistics.
2	IM2007	ENGINEERING MATHEMATICS II	4.0	IM1007	Lec: 39 hrs Tut: 13 hrs	Linear Algebra. Complex Variables. Vector Differential Calculus. Vector Integral Calculus.
3	IM3001	DIGITAL SIGNAL PROCESSING	3.0	IM2004	Lec: 26 hrs Tut: 13 hrs	Introduction. Discrete Fourier Transform (DFT) and Fast Fourier Transform (FFT). Z-Transform. Digital Filter Design.
3	IM3002	COMMUNICATION PRINCIPLES	3.0	IM2004	Lec: 26 hrs Tut: 13 hrs	Review of signal analysis and noise representations. Linear modulation. Frequency and phase modulation. Digital communication principles.
3	IM3003	INFORMATION SECURITY	3.0	Nil	Lec: 26 hrs Tut: 13 hrs	Introduction. Secret / public-key cryptosystems. Secure protocols. Electronic election and digital money. Intrusion detection and database security.
3	IM3072	PROJECT	1.0	Nil	Lab: 39 hrs	
4	HW310	PROFESSIONAL COMMUNICATION	2.0	HW001	Lec: 12 hrs Tut: 12 hrs	Business writing. Career strategies: résumés, cover letters, interviews. Oral presentation skills. Intercultural communication. Meetings and conflict management.
4	IM4001	MULTIMEDIA SYSTEMS	3.0	Nil	Lec: 26 hrs Tut: 13 hrs	Fundamentals of Multimedia Systems. Overview of Digital Image and Video Coding Standards. Overview of Digital Audio Coding Standard. Multimedia Communications. Multimedia Applications.

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4	IM4040	ENGINEERS AND SOCIETY	3.0	Nil	Lec: 26 hrs Tut: 13 hrs	The course comprises 4 main topics: Evolution of Modern Singapore; Technology & Society; Ethics and Professionalism and The Environment. The students are made aware of "Current Issues" at the time of their study.
4	IM4041	HUMAN RESOURCE MANAGEMENT	3.0	Nil	Lec: 26 hrs Tut: 13 hrs	
4	IM4079	FINALYEAR PROJECT	10.0	Nil	Lec: 26 hrs Tut: 13 hrs	Projects may include, but are not limited to, one or more of the following areas: Design, Product development, Software development, Laboratory investigation, Computing and analysis, Field testing and instrumentation and Feasibility studies. Besides project proposals generated by its own academic staff, the School also works with outside partners including the A*STAR Research Institutes and industrial companies to propose relevant projects.
4	IM4152	DIGITAL COMMUNICATIONS	3.0	IM3002	Lec: 26 hrs Tut: 13 hrs	Digital communication principles. Information theory. Error correcting codes. Optimum signal detection.
4	IM4153	TELECOMMUNICATION SYSTEMS	3.0	IM3002	Lec: 26 hrs Tut: 13 hrs	Telecommunication Networks. Switching and Signaling. Line Transmission. Microwave Communication Systems. Optical Fibre Communication Systems and Applications.
4	IM4188	WIRELESS COMMUNICATIONS	3.0	IM3002	Lec: 26 hrs Tut: 13 hrs	Types of wireless systems. Radio frequency spectrum. Performance calculations. Cellular radio systems.
4	IM4455	EMBEDDED SYSTEMS	3.0	IM2002	Lec: 26 hrs Tut: 13 hrs	Introduction to Embedded System and Embedded Processors. Hardware of embedded systems. Software of embedded systems. Real-Time Embedded System. Embedded Media Processing Components Design. Standards.
4	IM4475	AUDIO SIGNAL PROCESSING	3.0	Nil	Lec: 26 hrs Tut: 13 hrs	Fundamentals of Human Hearing. Room Acoustics. 3-D Sound Synthesis. Sound Compression.
4	IM4476	IMAGE PROCESSING	3.0	Nil	Lec: 26 hrs Tut: 13 hrs	Digital Image Fundamentals. Image Transforms. Image Enhancement. Image Restoration. Image Compression. Nonlinear Image Processing. Applications.
4	IM4478	DIGITAL VIDEO PROCESSING	3.0	Nil	Lec: 26 hrs Tut: 13 hrs	Fundamentals of Digital Video. Block-matching Motion Estimation and Fast Algorithms. Video Coding Basics. Video Coding Standards. Video Streaming and Processing. Applications.
4	IM4483	ARTIFICIAL INTELLIGENCE & DATA MINING	3.0	Nil	Lec: 26 hrs Tut: 13 hrs	Problem solving techniques. Machine learning and applications to data mining.
4	IM4756	COMPUTER ARCHITECTURE	3.0	Nil	Lec: 26 hrs Tut: 13 hrs	Fundamental of Computer Design. Instruction Set Architecture. Memory-system Architecture. Buses, Storage Devices and I/O System. RISC Design. Pipelining.

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4	IM4757	COMPUTER SYSTEM SOFTWARE	3.0	Nil	Lec: 26 hrs Tut: 13 hrs	Assemblers, Loaders, Linkers. Introduction to Compilers. Principles of Operating Systems. Implementation Examples of Operating Systems.
4	IM4761	COMPUTER ARCHITECTURE	3.0	IM2003	Lec: 26 hrs Tut: 13 hrs	Computer network architecture and services. Internetworking protocols and routing. Transport protocols. Application services and multimedia networking.
4	IM4762	WEB SERVICES	3.0	Nil	Lec: 26 hrs Tut: 13 hrs	Introduction. Web services architecture. Infrastructure support for web services. Web services standards and protocols. Web services development platforms and tools.
4	IM4770	COMPUTER GRAPHICS & ANIMATION	3.0	Nil	Lec: 26 hrs Tut: 13 hrs	Basics of Computer Graphics: Introduction, Graphics Pipeline and Coordinate Systems, Introduction to Ray Tracing, Shapes, 2D Transformations and viewing, 3D Transformations, 3D Viewing, OpenGL, Illumination and Shading. Computer Graphics Applications: Computer Animation, Physically-based Modelling, Real-time Rendering, Graphical User Interfaces, Virtual Reality.
4	IM4771	COMPUTER VISION	3.0	Nil	Lec: 26 hrs Tut: 13 hrs	Image Representation. Preprocessing Techniques. Segmentation and Representation. Recognition and Machine Intelligence. Machine Vision Applications.
4	IM4772	VISUALISATION	3.0	Nil	Lec: 26 hrs Tut: 13 hrs	3D Computer graphics. Visualisation pipeline. Graphical data representation. Visualisation algorithms and applications.
4	IM4773	GEOMETRIC MODELLING	3.0	Nil	Lec: 26 hrs Tut: 13 hrs	Parametric curves and surfaces: bezier, B-spline, nurbs, surfaces of revolution, Swept surfaces, 2D and 3D "De Casteljau" algorithm. Implicit surfaces: algebraic surfaces, quadrics, superquadrics, blending, blending functions, skeletons, convolution surfaces. Subdivision surfaces. Normal vector calculation. Surfaces representation: polygonization, grids, octrees, points, CSG.
4	IM4774	COMPUTER GAME PROGRAMMING	3.0	Nil	Lec: 26 hrs Tut: 13 hrs	History of computer/video game technology. Game genres and design principles. The social impact of games. Event loops and execution threads. Rendering and animation in 3D. Terrain/background representation. Polygonal models. Texturing. Collision detection. Physically-based modeling. Game AI. Multi-user games and networking.
4	IM4791	DATABASE SYSTEMS	3.0	Nil	Lec: 26 hrs Tut: 13 hrs	Introduction to Database and Data Modelling. Logical Database Design and The Relational Model. The Structured Query Language (SQL). Physical Database Design. Database Administration. Client/Server Database. Data Warehousing.