Undergraduate Programs
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Vision Statement of CSE Department:

To be internationally renowned in Computer Science and Engineering and to exalt excellence in education, research, industrial profession, and entrepreneurship for sustainable transformation of the society.

Mission of CSE Department:

1. To advance knowledge and learning of evolving challenges in Computer Science and Engineering through quality education and research towards the development of the society.

2. To sustain an outstanding hub dedicated to excellence in education, research & development, and entrepreneurship; and to become internationally recognized to meet national and international needs.

3. To enhance the quality of students with advanced knowledge and skills of Computer Science and Engineering and related disciplines to meet contemporary needs in the areas of education, research & development, leadership, and entrepreneurship.

Program Educational Objectives (PEOs) of B. Sc. in CSE Program:

Graduates of the B. Sc. in CSE program are expected to attain the following Program Educational Objectives (PEO) within few years, such as 3-5 years, of graduation.

PEO1	Graduates will establish themselves as leading computational professionals and/or entrepreneurs; and continue to learn and address evolving challenges in Computer Science and Engineering.
PEO2	Graduates will engage themselves in lifelong pursuit of knowledge and interdisciplinary learning for industrial, research, and academic careers and/or leadership and entrepreneurship development.
PEO3	Graduates will contribute to sustainable development and the well-being of the society through the use of Computer Science and Engineering principles, practices and tools in an ethical and responsible manner.

Program Outcomes (POs) of B. Sc. in CSE Program Graduates of the B. Sc. in CSE program are expected to attain the following Program Outcomes (POs) by the time of graduation.

PO	Description
PO1: Engineering Knowledge	Apply knowledge of mathematics, natural sciences, engineering fundamentals and an engineering specialization as specified in K1 to K4 respectively to the solution of complex computer science and engineering problems (EP1 to EP7).

PO2: Problem Analysis	Identify, formulate, research literature and analyze complex computer science and engineering problems (EP1 to EP7) reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences. (K1 to K4)
PO3: Design/ Development of Solutions	Design solutions for complex computer science and engineering problems (EP1 to EP7) and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations. (K5)
PO4: Investigation	Conduct investigations of complex computer science and engineering problems (EP1 to EP7) using research-based knowledge (K8) and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.
PO5: Modern Tool Usage	Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modeling, to complex computer science and engineering problems (EP1 to EP7), with an understanding of the limitations. (K6)
PO6: The Engineer and Society	Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional computer science and engineering practice and solutions to complex computer science and engineering problems (EP1 to EP7). (K7)

PO7: Environment and Sustainability	Understand and evaluate the sustainability and impact of professional computer science and engineering work in the solution of complex computer science and engineering problems (EP1 to EP7) in societal and environmental contexts. (K7)
PO8: Ethics	Apply ethical principles and commit to professional ethics and responsibilities and norms of computer science and engineering practice. (K7)
PO9: Individual Work and Teamwork	Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.
PO10: Communication	Communicate effectively on complex computer science and engineering activities (EA1 to EA5) with the computer science and engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11: Project Management and Finance	Demonstrate knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12: Life-Long Learning	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Mapping of Program Outcomes (POs) to Program Educational Objectives (PEOs)

Program Outcomes (POs)	Program Educational Objectives (PEOs)		
	PEO1	PEO2	PEO3
PO1: Engineering Knowledge	X		
PO2: Problem Analysis	X		
PO3: Design/Development of Solutions	X		
PO4: Investigation		X	
PO5: Modern Tool Usage		X	
PO6: The Engineer and Society			X
PO7: Environment and Sustainability			X
PO8: Ethics			X
PO9: Individual Work and Teamwork			X
PO10: Communication	X		
PO11: Project Management and Finance		X	

PO12: Life-Long Learning   X

Knowledge Profile

The B. Sc. in CSE curriculum must encompasses all the elements of the knowledge profile to achieve the program outcomes PO1 to PO8.

Knowledge Profile	Attribute
K1: Theory-based natural sciences	A systematic, theory-based understanding of the natural sciences applicable to the discipline
K2: Conceptually-based mathematics, numerical analysis, statistics, and formal aspects of computer and information science	Conceptually based mathematics, numerical analysis, statistics and the formal aspects of computer and information science to support analysis and modeling applicable to the discipline
K3: Theory-based engineering fundamentals	A systematic, theory-based formulation of engineering fundamentals required in the engineering discipline
K4: Forefront engineering specialist knowledge for practice	Engineering specialist knowledge that provides theoretical frameworks and bodies of knowledge for the accepted practice areas in the engineering discipline; much is at the forefront of the discipline
K5: Engineering design	Knowledge that supports engineering design in a practice area
K6: Engineering practice (technology)	Knowledge of engineering practice (technology) in the practice areas in the engineering discipline

K7: Comprehension of engineering in society	Comprehension of the role of engineering in society and identified issues in engineering practice in the discipline: ethics and the engineer's professional responsibility to public safety; the impacts of engineering activity; economic, social, cultural, environmental and sustainability
K8: Research literature	Engagement with selected knowledge in the research literature of the discipline

Range of Complex Engineering Problem Solving

Complex engineering problem solving as required in PO1, PO2, PO3, PO4, PO5, PO6, and PO7 are problems that have EP1 and some or all of EP2 to EP7 characteristics.

Attribute	Characteristics of Complex Engineering Problems
EP1: Depth of knowledge required	Cannot be resolved without in-depth engineering knowledge at the level of one or more of K3, K4, K5, K6, or K8 which allows a fundamental-based, first principles analytical approach
EP2: Range of conflicting requirements	Involve wide-ranging or conflicting technical, engineering and other issues
EP3: Depth of analysis required	Have no obvious solution and require abstract thinking, originality in analysis to formulate suitable models
EP4: Familiarity of issues	Involve infrequently encountered issues
EP5: Extent of applicable codes	Are outside problems encompassed by standards and codes of practice for professional engineering

EP 6: Extent of stakeholder involvement and conflicting requirements	Involve diverse groups of stakeholders with widely varying needs
EP7: Interdependence	Are high level problems including many component parts or sub-problems

Range of Complex Engineering Activities

Complex engineering activities as required in PO10 are engineering activities or projects that have some or all of EA1 to EA5 characteristics.

Attribute	Characteristics of Complex Engineering Activities
EA1: Range of resources	Involve the use of diverse resources (for this purpose, resources include people, money, equipment, materials, information and technologies)
EA2: Level of interaction	Require resolution of significant problems arising from interactions between wide-ranging or conflicting technical, engineering or other issues
EA3: Innovation	Involve creative use of engineering principles and research-based knowledge in novel ways
EA4: Consequences for society and the environment	Have significant consequences in a range of contexts, characterized by difficulty of prediction and mitigation

EA5: Familiarity	Can extend beyond previous experiences by applying principle-based approaches

Course Summary

Course Category	Credits
Compulsory Language and General Education Courses	9
Elective General Education Courses	9
Compulsory Basic Science Courses	11
Compulsory Mathematics and Statistics Courses	15
Core Computer Science and Engineering Courses	62
Core Capstone Project	6
Major Compulsory and Elective Computer Science and Engineering Courses	20
Non-major Elective Computer Science and Engineering Courses	8
Total	140

List of Courses

Course	Credits	Prerequisite
Compulsory Language and General Education Courses	9	
ENG101 Basic English	3	
ENG 102 Composition and Communication Skills	3	ENG101
GEN226 Emergence of Bangladesh	3	ENG102
Elective General Education Courses	9	
Social Science Courses (any one course)	3	
ECO101 Principle of Microeconomics	3	None
GEN203 Ecological System and Environment	3	None
GEN214 Development Studies	3	ENG102
SOC317 Sociology of Science and Technology	3	None
Arts and Humanities Courses (any one course)	3	

Course	Credit	Prerequisite
GEN201 Bangladesh Studies	3	ENG102
GEN204 Western Thought	3	None
GEN210 International Relation	3	ENG102
SOC211 Eastern Culture and Heritage	3	None
SOC217 Religion, Ethnicity, Culture and Development in South Asia	3	ENG102
Business Courses (any one course)	3	
ACT101 Financial Accounting	3	None
BUS321 Business for Engineering and Technology	3	ENG102
BUS231 Business Communication	3	ENG102
MGT321 Industrial Management	3	ENG102
MGT337 Production Operations Management	3	STA102
FIN101 Principle of Finance	3	STA102
MKT101 Principle of Marketing	3	None

Compulsory Natural Science Courses	9+2=11	
PHY109 Engineering Physics-I (Introductory Classical Physics)	3+1=4	MAT102
PHY209 Engineering Physics-II (Introductory Quantum Physics)	3+0=3	MAT205
CHE109 Engineering Chemistry	3+1=4	
Compulsory Mathematics and Statistics Courses	15	
MAT101 Differential and Integral Calculus	3	
MAT102 Differential Equations and Special Functions	3	MAT101
MAT104 Coordinate Geometry and Vector Analysis	3	MAT101
MAT205 Linear Algebra and Complex Variable	3	MAT102
STA102 Statistics and Probability	3	

Core Computer Science and Engineering Courses	48+14=62	
CSE103 Structured Programming	3+1.5=4.5	
CSE106 Discrete Mathematics	3+0=3	CSE103
CSE110 Object Oriented Programming	3+1.5=4.5	CSE106
CSE200 Computer-Aided Engineering Drawing	0+1=1	
CSE209 Electrical Circuits	3+1=4	
CSE207 Data Structures	3+1=4	CSE110
CSE251 Electronic Circuits	3+1=4	CSE209
CSE246 Algorithms	3+1.5=4.5	CSE207
CSE302 Database Systems	3+1.5=4.5	CSE106
CSE325 Operating Systems	3+1=4	CSE207
CSE345 Digital Logic Design	3+1=4	CSE251

CSE347 Information System Analysis and Design	3+1=4	CSE302
CSE360 Computer Architecture	3+0=3	CSE325
CSE405 Computer Networks	3+1=4	CSE246
CSE407 Green Computing	3+0=3	CSE405
CSE487 Cyber Security, Ethics and Law	3+0=3	CSE405
CSE495 IT Project Management and Entrepreneurship	3+0=3	CSE347
Core Capstone Project	0+6=6	
CSE400 Capstone Project	0+6=6	Completed at least 105 credit hours
Major Requirements	Courses from the selected major area	
Student should select one of the four major areas for degree major requirement	Two Compulsory courses (6+2=8 credits)	Three elective courses (9+3=12 credits)

Non-Major Elective Requirements

Minimum 8 credits (two to three courses depending on credits of the courses) from one or more major/non-major areas other than the selected major area

Four Major Areas and Courses (2 Compulsory and 3 Elective Courses)	15+5=20	
1. Intelligent Systems and Data Science	15+5=20	
Compulsory Courses	6+2=8	
CSE303 Statistics for Data Science	3+1=4	STA102
CSE366 Artificial Intelligence	3+1=4	CSE246
Elective Courses (Any 3 Courses)	9+3=12	
CSE420 Computer Graphics	3+1=4	CSE246
CSE438 Digital Image Processing	3+1=4	CSE246

CSE445 Computer Vision	3+1=4	CSE246
CSE452 Distributed Systems and Algorithms	3+1=4	CSE325
CSE474 Pattern Recognition	3+1=4	CSE366
CSE475 Machine Learning	3+1=4	CSE366
CSE477 Data Mining	3+1=4	CSE366
CSE481 Nature-Inspired Computing	3+1=4	CSE246
CSE486 Bioinformatics Algorithms	3+1=4	CSE246
CSE488 Big Data Analytics	3+1=4	CSE302
2. Software Engineering	15+5=20	
Compulsory Courses	6+2=8	
CSE412 Software Engineering	3+1=4	CSE347
CSE430 Software Testing and Quality Assurance	3+1=4	CSE412

Elective Courses (Any 3 Courses)	9+3=12	
CSE422 Simulation and Modeling	3+1=4	CSE246
CSE423 Software Architecture	3+1=4	CSE412
CSE428 Human Computer Interactions	3+1=4	CSE412
CSE452 Distributed Systems and Algorithms	3+1=4	CSE325
CSE464 Advanced Database System	3+1=4	CSE302
CSE479 Web Programming	3+1=4	CSE302
CSE489 Mobile Programming	3+1=4	CSE246
3. Communications and Networking	15+5=20	
Compulsory Courses	6+2=8	
CSE350 Data Communications	3+1=4	CSE251
CSE432 Digital Signal Processing	3+1=4	CSE246
Elective Courses (Any 3 Courses)	9+3=12	

CSE452 Distributed Systems and Algorithms	3+1=4	CSE325
CSE453Wireless Networks	3+1=4	CSE405
CSE457 Cellular Networks	3+1=4	CSE405
CSE472 Advanced Network Services and Management	3+1=4	CSE405
CSE473 Network Security and Systems	3+1=4	CSE405
CSE489 Mobile Programming	3+1=4	CSE246
4. Hardware Engineering	15+5=20	
Compulsory Courses	6+2=8	
CSE355 Digital System Design	3+1=4	CSE345
CSE442 Microprocessors and Microcontrollers	3+1=4	CSE360
Elective Courses (Any 3 Courses)	9+3=12	
CSE406 Internet of Things	3+1=4	CSE405

CSE446 ASIC Design Using FPGA	3+1=4	CSE345
CSE491 VLSI Design	3+1=4	CSE345
CSE492 Robotics	3+1=4	CSE366
CSE494 Embedded Systems	3+1=4	CSE442

Non-Major Area: Computational Theory

CSE225 Numerical Methods	3+1=4	CSE103
CSE313 Theory of Computations	3+0=3	CSE246
CSE460 Cryptography	3+0=3	CSE246
CSE471 Compiler Design	3+1=4	CSE246
CSE483 Graph Theory	3+0=3	CSE246
CSE484 Computational Geometry	3+0=3	CSE246

Note: Course to PO mapping is under revision.

Course Flowchart

		1st Year		2nd Year		3rd Year		4th Year	
		Course (Credit)	Pre-requisite	Course	Pre-requisite	Course	Pre-requisite	Course	Pre-requisite
1st Semester		ENG101 Basic English (3)		GEN226 Emergence of Bangladesh (3)	ENG 102	Elective General Education-III (3)		CSE400 Capstone Project-I (0+1=1)	
		MAT101 Differential and Integral Calculus (3)		STA102 Statistics and Probability (3)		CSE246 Algorithms (3+1.5=4.5)	CSE 207	CSE407 Green Computing (3+0=3)	CSE 405
		CSE103 Structured Programming (3+1.5=4.5)		CSE200 Computer-Aided Engineering Drawing (0+1=1)		CSE302 Database Systems (3+1.5=4.5)	CSE 106	Elective Major-I (3+1=4)	
				CSE209 Electrical Circuits (3+1=4)				Elective Non-Major-I (3+1=4)	

	ENG102 Composition And Communication Skills (3)	ENG 101	Elective General Education-I (3)		CSE345 Digital Logic Design (3+1=4)	CSE 251	CSE400 Capstone Project-II (0+2=2)	
2nd Semester	MAT102 Differential Equations and Special Functions (3)	MAT 101	MAT205 Linear Algebra and Complex Variables (3)	MAT 102	CSE347 Information System Analysis and Design (3+1=4)	CSE 302	CSE487 Cyber Security, Ethics and Law (3+0=3)	CSE 405
	CSE106 Discrete Mathematics (3+0=3)	CSE103	CSE207 Data Structures (3+1=4)	CSE110	Compulsory Major-I (3+1=4)		Elective Major-II (3+1=4)	
	CHE109 Engineering Chemistry (3+1=4)		CSE251 Electronic Circuits (3+1=4)	CSE 209			Elective Non-Major-II (3+1=4)	

	PHY109 Engineering Physics-I (3+1=4)	MAT 102	Elective General Education-II (3)		CSE360 Computer Architecture (3+0=3)	CSE 325	CSE400 Capstone Project-III (0+3=3)	
3rd Semester	MAT104 Coordinate Geometry and Vector Analysis (3)	MAT 101	PHY209 Engineering Physics-II (3+0=3)	MAT 205	CSE 405 Computer Networks (3+1=4)	CSE 246	CSE495 IT Project Management and Entrepreneurship (3+0=3)	CSE 347
	CSE110 Object Oriented Programming (3+1.5=4.5)	CSE1 06	CSE325 Operating Systems (3+1=4)	CSE 207	Compulsory Major-II (3+1=4)		Elective Major-III (3+1=4)	
Year-Credit	35		35		35		35	

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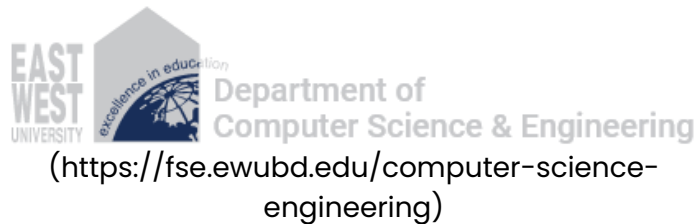
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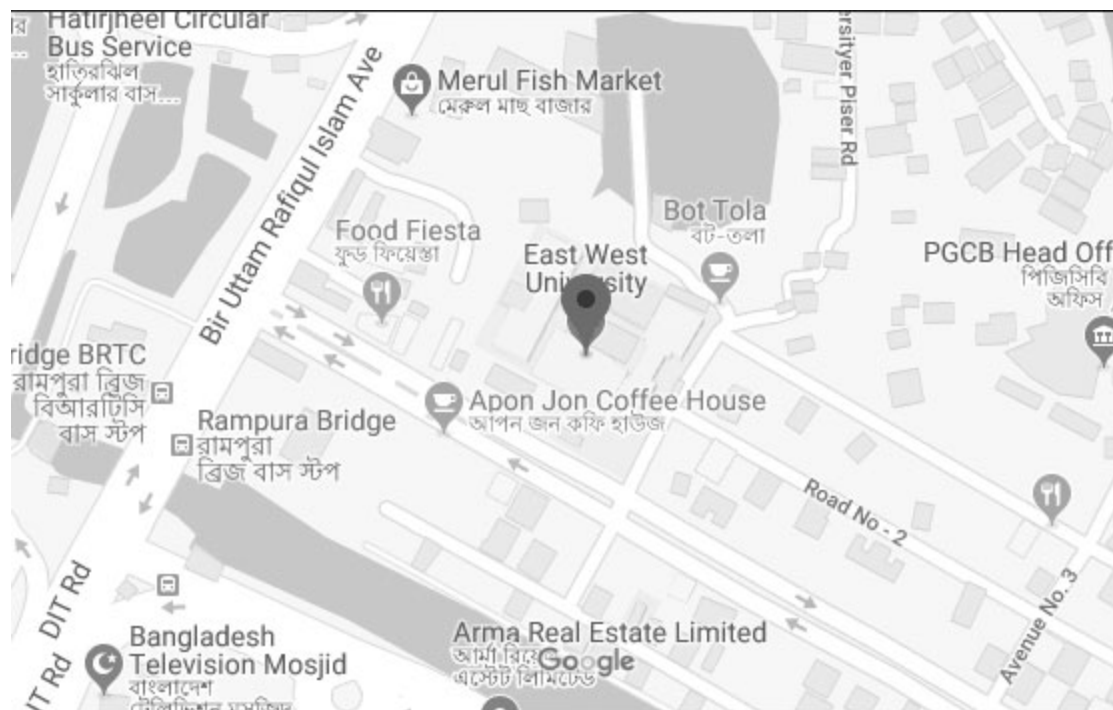
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