



Heritage Institute of Technology

(An Autonomous Institution)

POs & PEOs

Programme Outcomes: B.Tech

Engineering Graduates will be able to:

PO1: Engineering knowledge- Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem analysis- Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design/development of solutions- Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: Conduct investigations of complex problems- Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the 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 engineering activities with an understanding of the limitations.

PO6: The engineer and society- Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and sustainability- Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics- Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and team work- Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication- Communicate effectively on complex engineering activities with the 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 the engineering and management principles 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.

Applied Electronics & Instrumentation Engineering

Programme Educational Objectives (PEOs): B.Tech

1. The graduates of Applied Electronics & Instrumentation Engineering Program should be able to establish them as practicing professionals in industries /R&D laboratories / academic sectors, or have achieved higher educational qualifications.
2. The graduates of Applied Electronics & Instrumentation Engineering Program should be able to adapt themselves with latest developments in the discipline, including application of modern technologies.
3. The graduates of Applied Electronics & Instrumentation Engineering Program should be able to demonstrate their ability to work as leaders and team members at workplace.

Programme Educational Objectives: M.Tech

The post graduates will be able to

1. Establish themselves as professionals in industries/R&D laboratories/academic sectors, or engage in advanced studies in electronics, instrumentation, electrical engineering or related areas.
2. Acquire technical knowledge, skill and competence to identify, comprehend and solve problems in industry, research and academics related to electronics, instrumentation and other related areas.
3. Demonstrate their ability to work successfully as a member of a professional team and function effectively as responsible professionals.

Programme Specific Outcomes : B.Tech

The graduates of AEIE will be able to:

PSO1: Gain the concepts of electronic circuits, sensors, measurements and instrumentation systems for industrial applications.

PSO2: Apply appropriate technique, hardware and software tools to develop microprocessor and microcontroller based instrumentation systems for process automation and control.

PSO3: Develop effective engineering solutions through execution of projects, better documentation and presentation skill sets, towards the improvement of society, environment and industries, by ethical means.

Programme Outcomes : M.Tech

On successful completion of the program the post graduate students of AEIE, Heritage Institute of Technology, Kolkata, should be able to:

- a) Acquire knowledge to evaluate, analyze and synthesize any technical problem related to the relevant subjects of the instrumentation engineering.
- b) Apply knowledge of mathematics, science, and engineering for the analysis and design of various problems related to industry or research and development.
- c) Learn different type of sensors, transducers, signal conditioning circuitry, instrumentation systems and their control loops used in an automated process plants.
- d) Design and apply different type of sensors using distinct micro fabrication techniques and modern engineering tools such as MATLAB and develop their profession in teaching, research and industry.
- e) Apply knowledge of modern signal processing techniques for signal conditioning and data interpretation with the help of technical computing software like MATLAB and digital signal processors.

- f)** Apply the knowledge of artificial intelligence and soft computing to develop and analyze various smart instrumentation and control systems.
- g)** Acquire knowledge on different types of analytical, optical, biomedical instruments that are frequently used in industries, clinical laboratories or in R&D.
- h)** Interpret, represent and communicate something very effectively to the audience.
- i)** Design and conduct experiments as well as to analyze and interpret data.
- j)** Develop their carrier in teaching, research and in industry.
- k)** Solve and analyze industrial problems, and execute research projects.
- l)** Develop ethical and social responsibilities to contribute to the community and engage themselves in life-long learning for continuous improvement by making necessary corrective action.

Biotechnology

Programme Educational Objectives : B.Tech

With five years of graduation, with B. Tech. (Biotechnology) from the Heritage Institute of Technology, the graduate will:

1. Be engaged in a professional career in biotechnology or other related industries.
2. Demonstrate adherence to the professional codes of conduct appropriate to his/her field of study and/or practice, as well as exhibit behavior consistent with accepted standards of responsibility, risk/benefit analysis and professional accountability.
3. Work in a technically competent manner as a leader as well as a team member to address challenges in engineering or their chosen profession, considering the ethical matters and social concerns.
4. Develop their technical knowledge and professional skills through self-directed lifelong learning.

Programme Educational Objectives : M.Tech

Graduates of the M.Tech. Biotechnology programme are expected to attain within a few years of graduation:

1. Establish themselves as practicing professionals in Biotechnology and give directions to Biotechnology education, research and industrial applications.
2. Enhance their professional knowledge and skill through academic programmes for higher degrees/ self-directed lifelong learning for application in social needs by innovative practices.
3. Demonstrate their ability to work in a multi-disciplinary team with a capacity to share and disseminate knowledge.

Programme Specific Outcomes : B.Tech

1. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
2. Ability to demonstrate a better understanding of diagnosis and treatment of diseases through noble biotechnology approaches.
3. Ability to provide a cost-effective environment-friendly and less-energy consuming solution to a problem.

Programme Outcomes : M.Tech

On successful completion of the programme the post graduate students of Biotechnology, Heritage Institute of Technology, Kolkata, will acquire:

- a. An ability to apply the knowledge of different aspects of Biotechnology and other allied engineering disciplines in academic sectors, industries and R & D organizations.
- b. An ability to understand a problem from different viewpoints, find out its novel features, design experiments accordingly, analyse results critically with precision.
- c. An ability to integrate different problems, find out pragmatic solutions and evaluate their impacts on society, environment, economy and human health for sustainable development.
- d. An ability to update themselves with modern technologies with a conceptual understanding of their advantages and limitations.

- e. An ability to demonstrate a capacity of working in a multi-disciplinary team, with objectivity, teamwork, self-management and emotion management to achieve a common goal.
- f. An ability to evaluate the commercial viability of a project and to execute the viable projects through proper use of human resources.
- g. An ability to communicate with the peer groups as well as society at large to share and disseminate knowledge and applications of Biotechnology and comprehend and write reports and make proper documentation and give and receive clear instructions.
- h. An ability to develop a desire for lifelong learning and inculcate self-learning qualities through critical observations of mistakes.
- i. An ability to understand the need of society, develop social and professional responsibilities and ethics.
- j. An ability to understand genetic makeup and process of manipulation of microorganisms, plants and humans to meet the agricultural and industrial needs.
- k. An ability to search for a suitable alternative to chemical technology for better production and environment management.
- l. An ability to understand the human diseases and provide therapeutic solution by use of novel biomolecules.

Programme Educational Objective : B.Tech

The students coming out of B.Tech program in Chemical Engineering of Heritage Institute of Technology, Kolkata after 5/10 year of graduation are expected

1. to have established themselves as practicing professionals in reputed industries including PSUs and MNCs or have achieved higher educational qualifications and innovative research skill for pursuing research in R&D laboratories as well as in academic sectors.
2. to have been adapted themselves with latest developments in the discipline, including application of modern technologies in the field of Chemical Engineering Science and allied areas.
3. to demonstrate their ability to work in a team with leadership qualities.

Programme Educational Objective (PEOs):

The graduate students with the B.Tech. (Civil Engineering), degree from Heritage Institute of Technology, Kolkata are expected to attain the following after a few years of getting this degree:

1. Establish themselves as successful Civil Engineering professionals and entrepreneurs.
2. Prove their academic and research expertise in the field of higher studies through Masters and/or Doctoral programme at different institutes in India and abroad.
3. Demonstrate their sense of professionalism, leadership qualities and team work abilities in their professions.

Program Specific Outcomes (PSOs):

Engineering Graduates will be able to:

PSO1: An ability to apply knowledge of structural analysis to design and estimate different concrete and steel structures.

PSO2: Apply their knowledge of soil and rock mechanics to characterize its behavior and concept of foundation engineering to analyze and design geotechnical structures.

PSO3: An ability to develop, analyze and interpret hydrological data to design different components of hydraulic structures, water and waste water management system for meeting socio economical and environmental needs.

PSO4: An ability to conduct different types of surveys, analysis of traffic data for highway planning, design, construction and maintenance of roads.

Programme Educational Objectives: M.Tech

The Programme Educational Objectives (PEO) formulated by the Department of Computer Science and Engineering for the M.Tech Curriculum is to train post - graduate students

1. To meet the ongoing industry needs of practicing professionals within India and abroad.
2. To pursue relevant research work in specialized areas.
3. To fulfill the growing needs of various technical institutes in India for competent faculties in related subjects.
4. To inculcate amongst the graduates the ability to learn on-the-job so that they can cope with the evolving nature of this subject and the dynamic character of the IT industry

Programme Outcomes : M.Tech

- a) To acquire in-depth knowledge of a specific professional area related to Computer Science and Engineering – Project induces in-depth knowledge assimilation from present state-of-the-art literature for enabling students to think in an innovative way.
- b) To analyze / synthesize both existing and new knowledge pertaining to a wide range of computational problems – Once in-depth knowledge is acquired analysis and synthesis is needed to critically appreciate the state-of-the-art methods and thereby leading to an improvement over the present state-of-the-art.
- c) To analyze complex engineering problems related to applications of computing methods and technologies – Practical implementations lead to engineering problem and thereby solving them the students get to achieve this programme outcome.
- d) To apply independent judgment for assimilating information based on data analysis and statistical techniques – Project work requires analysis using sophisticated methods and analysis helps in better understanding the problem, or the proposed solution(s).
- e) To think laterally for conceptualization and solution of engineering problems through appropriate application of computing algorithms – Innovative thinking is needed for solving problems related to project work.
- f) To arrive at feasible, optimal / feasible solutions after factoring in a diverse range of conflicting factors such as time and/or space complexity of algorithms – Mathematical background and the theoretical knowledge needed to analyze different aspects of an algorithm, is taught in the curriculum. Using that knowledge, students may achieve this program outcome.
- g) To extract information pertinent to unfamiliar problems through literature survey and computing experiments – This can be derived from knowledge disseminated through classes and lab sessions.
- h) To apply appropriate methodologies, computational techniques and software tools for designing and conducting experiments - This can be derived from knowledge disseminated through classes and lab sessions.
- i) To analyze and interpret data obtained through such surveys and experiments using suitable data mining paradigms - This can be derived from knowledge disseminated through appropriate classes and lab sessions.
- j) To apply appropriate software tools for analysis / modeling of complex engineering activities - This can be derived from knowledge disseminated through classes and lab sessions.
- k) To contribute effectively in cross-domain groups working on multi-disciplinary projects - This can be derived from knowledge disseminated through classes and lab sessions.
- l) To adopt management principles / practices for handling projects under various business constraints – Overall monitoring and evaluation of projects, two internal and one external evaluation every semester ensures this programme outcome

- m)** To communicate effectively with a diverse range of audience in discussions / meetings / presentations – Evaluation of projects involve report writing and presentations, which ensure communication with a diverse range of audience. Publishing conference/ journal papers add to it.
- n)** To compile useful reports / documentations as per applicable standards / guidelines – We encourage students to compile project reports using internationally recognized report writing tools like LaTeX. Standard international thesis templates are used to document project write-ups.
- o)** To adhere to code of conduct and ethical integrity in line with the profession - This can be derived from knowledge disseminated through knowledge acquired from humanities department classes on ethics in profession.
- p)** To adapt to situations demanding self-driven continuous learning – Motivational speeches are arranged and personal counseling is provided by mentors ensure this program outcome.

Program Educational Objectives (PEOs): B.Tech (ECE)

The graduate students with the B.Tech. (Electronics and Communication Engineering), degree from Heritage Institute of Technology, Kolkata are expected to attain the following after a few years of getting this degree:

They will attain:

1. **Strong foundation:** establish their ability to analyze and synthesize current Electronics and Communication Engineering practices by assimilating its basic and advanced approaches on way to become successful professionals in industries.
2. **Critical & Innovative Thinking:** prove their research orientation by their ability to handle versatile problems in Communication and related field by virtue of their knowledge acquired in course of the degree.
3. **Leadership, coordination & Group Activity:** demonstrate their ability to work in teams. They will prove themselves as good natured and well - behaved members of working teams as well as leaders in various diverse industries.
4. **Implementation of knowledge gained through interaction & effective communication skills in work places:** show their learning and teaching abilities and their communication efficiency in their work places

Program Educational Objectives (PEOs):M.Tech (ECE)

Postgraduate students with the M.Tech. (ECE), Communications specialization degree from Heritage Institute of Technology, Kolkata are expected to attain the following after a few years of getting this degree:

1. Established themselves as successful practicing professionals or are engaged in advance study in the field of Electronics and Communication Engineering.
2. Demonstrated their ability to work successfully as a member of a team in a profession an function effectively as successful professionals.
3. Proved their learning and teaching abilities and also obtained higher academic degrees in educational institutes.

Program Educational Objectives (PEOs): M.Tech (VLSI)

Postgraduate Students with the M.Tech in VLSI specialization degree from Heritage Institute of Technology, Kolkata are expected to attain the following after a few years of getting this degree:

1. Established themselves as successful practicing professional in the field of Core Semiconductor Industry
2. Demonstrated their skill in VLSI chip design using Industry Standard CAD Tools in advanced nano-technology process as used in VLSI Industry
3. Proved their ability to adapt to challenging work assignments using their learning from M.Tech degree and work as successful team member in Industry or Academia

Programme Specific Outcomes : B.Tech

The graduates of the department will attain:

PSO1: The ability to absorb and apply fundamental knowledge of core Electronics and Communication Engineering subjects in the analysis of various types of integrated electronic systems as well as to interpret and synthesize the experimental data leading to valid conclusions.

PSO2: Competence in using electronic modern IT tools (both software and hardware) for the design and analysis of complex electronic systems in furtherance to research activities.

PSO3: The capability to apply the concepts of Electronics and Communication Engineering to design and develop a variety of components and systems for applications including, but not limited to, signal processing, Communication, Embedded systems, VLSI and control system.

PSO4: Excellent adaptability to changing work environment, good interpersonal skills as a leader in a team in appreciation of professional ethics and societal responsibilities.

Programme Outcomes : M.Tech.

Students after obtaining M.Tech. degree in ECE will have:

PO1: An ability to independently carry out research /investigation and development work to solve practical problems

PO2: An ability to write and present a substantial technical report/document

PO3: Students should be able to demonstrate a degree of mastery over the area as per the specialization of the program. The mastery should be at a level higher than the requirements in the appropriate bachelor program

PO4: An ability to learn and apply modeling based approach and simulator tools for a given problem.

PO5: The power to communicate effectively with members in a team and with students.

PO6: Imbided a strong desire to pursue higher education.

Programme Outcomes : M.Tech-VLSI.

PO1: An ability to independently carry out research /investigation and development work to solve practical problems

PO2: An ability to write and present a substantial technical report/document

PO3: Students should be able to demonstrate a degree of mastery over the area as per the specialization of the program. The mastery should be at a level higher than the requirements in the appropriate bachelor program

PO4: An ability to learn and apply Industry oriented VLSI CAD Simulator tools for a given Chip Design problem.

PO5: Developing VLSI Chip Design Skill using Nano-Technology (Process) to enhance employability in Core Semiconductor Industry.

PO6: Imbided a strong desire to pursue research in VLSI domain.

Electrical Engineering

Programme Educational Objectives: B.Tech

Graduates of B.Tech in Electrical Engineering program are expected to attain after about 5/7 years of graduation:

1. To establish themselves as successful professionals of the society.
2. To acquire the requisite knowledge for higher studies in India and abroad.
3. To acquire the qualities of team work, leadership and entrepreneurship.

Information Technology

Programme Educational Objectives(PEO)

Graduates of the B. Tech programme in Information Technology at Heritage Institute of Technology are expected to achieve the following objectives after 5 years of graduation:

1. Established themselves as practicing professionals in industry or have significant contribution in R&D.
2. Achieved terminal degree & excelled in Academia.
3. Adapted themselves with latest developments in the discipline to survive and excel in the dynamic world of I.T.
4. Demonstrated their ability to work as team members and ready to become leaders at workplace.

PSO(Programme Specific Outcomes)

1. An ability to analyze, design, develop and test software systems that provide solution to real life problems worldwide.
2. An ability to learn next generation technologies through acquired foundation skills and knowledge which will enable the IT graduates to work efficiently in IT industries and also prepares them to take initiative to be an entrepreneur.
3. An ability to acquire skills in assimilating contemporary technologies to identify research trends and also prepare them for higher studies.

Mechanical Engineering

Programme Educational Objective (PEOs)

The students graduating from the B.Tech (Mechanical Engineering) programme of Heritage Institute of Technology about 5/7 years will

1. Prove themselves to be successful professionals in different industries in both private and public sectors in India / abroad.
2. Acquire higher educational qualifications in India & abroad and successfully apply their knowledge in teaching and research.
3. Exhibit qualities of team work, leadership and entrepreneurship.

Programme Specific Outcomes(PSOs)

1. Design mechanical product and system: Apply the knowledge of relevant fields of mechanical engineering to design products and systems.
2. Manufacturing products: Select suitable materials, processes and parameters for manufacturing quality products at competitive costs.
3. Total productivity management: Undertake activities concerning maintainability and quality of processes and equipment.

Computer Applications (MCA)

Programme Educational Objectives: MCA

Post Graduate students of the MCA programme are expected to:

1. Establish themselves as successful professionals in industry, government, academia, research and development, entrepreneurship and consultation.
2. Achieve peer-recognition; as an individual or in a team; through demonstration of good analytical, design and implementation skills.
3. Be innovative in research and development activities through sustained learning.
4. Thrive to pursue life-long learning to fulfill their goals.

Programme Outcomes : MCA

On successful completion of the programme the post graduate students of MCA, Heritage Institute of Technology, Kolkata, will acquire:

1. An ability to identify, critically analyze, formulate and develop computer applications for solving practical problems.
2. An ability to apply knowledge of mathematics, computer science and management in practice.
3. Expertise in software project development by in-depth review of problem domain, comprehensive analysis of solution concerned, and implementing the same for achieving the project goal in a successful manner.
4. An ability to excel in oral and written communication as well as presentation skills which are required for documenting and delivering the project artifacts effectively.
5. An ability to adapt professional ethics and cyber regulations in computing practices.
6. An ability to design & conduct experiments, as well as to analyze & interpret data.
7. An ability to work on multidisciplinary tasks using new and emerging technologies.
8. An ability to develop confidence for self-learning and to pursue lifelong learning.