TECNIA INSTITUTE OF ADVANCED STUDIES

NAAC Accredited Grade 'A' Institute

Internal Quality Assessment Cell
IQAC

Ref. No.: TIAS/IQAC/2021-22/126A **Dated: 01.12.2021**

-: Competencies Performance Indicator:-

PO 1: ICT knowledge: Apply the knowledge of mathematics, science, computer fundamentals, and an computer specialization for the solution of complex ICT problems.		
Competency		**Indicators**
1.2	Demonstrate competence in mathematical modeling	1.2.1 Apply the knowledge of discrete structures, linear algebra, statistics and numerical techniques to solve problems 1.2.2 Apply the concepts of probability, statistics and queuing theory in modeling of computer-based system, data and network protocols.
1.5	Demonstrate competence in basic sciences	1.5.1 Apply laws of natural science to an ICT problem
1.6	Demonstrate competence in ICT fundamentals	1.6.1 Apply ICT fundamentals
1.7	Demonstrate competence in specialized ICT knowledge to the program	1.7.1 Apply theory and principles of computer science and ICT to solve an ICT problem
PO 2: Problem analysis: Identify, formulate, research literature, and analyze complex ICT problems reaching Substantiated conclusions using first principles of mathematics, natural sciences, and ICT & computer sciences.		
Competency		**Indicators**
2.1	Demonstrate an ability to identify and formulate complex ICT problem	2.5.1 Evaluate problem statements and identifies objectives 2.5.2 Identify processes/modules/algorithms of a computer-based system and parameters to solve a problem 2.5.3 Identify mathematical algorithmic knowledge that applies to a given problem
2.6	Demonstrate an ability to formulate a solution plan and methodology for an ICT problem	2.6.1 Reframe the computer-based system into interconnected subsystems 2.6.2 Identify functionalities and computing resources. 2.6.3 Identify existing solution/methods to solve the problem, including forming justified approximations and assumptions 2.6.4 Compare and contrast alternative solution/methods to select the best methods 2.6.5 Compare and contrast alternative solution processes to select the best process.
2.7	Demonstrate an ability to formulate and interpret a model	2.7.1 Able to apply computer ICT principles to formulate modules of a system with required applicability and performance. 2.7.2 Identify design constraints for required performance criteria.
2.8	Demonstrate an ability to execute a solution process and analyze results	2.8.1 Applies ICT mathematics to implement the solution. 2.8.2 Analyze and interpret the results using contemporary tools. 2.8.3 Identify the limitations of the solution and sources/causes. 2.8.4 Arrive at conclusions with respect to the objectives.
PO 3: Design/Development of Solutions: Design solutions for complex ICT problems and design system components or processes that meet the specified needs with appropriate consideration for public health and safety, and cultural, societal, and environmental considerations.		
Competency		**Indicators**
3.5	Demonstrate an ability to define a complex/ open-ended problem in ICT terms	3.5.1 Able to define a precise problem statement with objectives and scope. 3.5.2 Able to identify and document system requirements from stake- holders. 3.5.3 Able to review state-of-the-art literature to synthesize system requirements. 3.5.4 Able to choose appropriate quality attributes as defined by ISO/IEC/IEEE standard. 3.5.5 Explore and synthesize system requirements from larger social and professional concerns. 3.5.6 Able to develop software requirement specifications (SRS).
3.6	Demonstrate an ability to generate a diverse set of alternative design solutions	3.6.1 Able to explore design alternatives. 3.6.2 Able to produce a variety of potential design solutions suited to meet functional requirements.

		3.6.3 Identify suitable non-functional requirements for evaluation of alternate design solutions.
3.7	Demonstrate an ability to select optimal design scheme for further development	3.7.1 Able to perform systematic evaluation of the degree to which several design concepts meet the criteria. 3.7.2 Consult with domain experts and stakeholders to select candidate ICT design solution for further development
3.8	Demonstrate an ability to advance an ICT design to defined end state	3.8.1 Able to refine architecture design into a detailed design within the existing Constraints. 3.8.2 Able to implement and integrate the modules. 3.8.3 Able to verify the functionalities and validate the design.
PO 4: 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.		
Competency		Indicators
4.4	Demonstrate an ability to conduct investigations of technical issues consistent with their level of knowledge and understanding	4.4.1 Define a problem for purposes of investigation, its scope and importance 4.4.2 Able to choose appropriate procedure/algorithm, dataset and test cases. 4.4.3 Able to choose appropriate hardware/software tools to conduct the experiment.
4.5	Demonstrate an ability to design experiments to solve open-ended problems	4.5.1 Design and develop appropriate procedures/methodologies based on the study objectives
4.6	Demonstrate an ability to analyze data and reach a valid conclusion	4.6.1 Use appropriate procedures, tools and techniques to collect and analyze data 4.6.2 Critically analyze data for trends and correlations, stating possible errors and limitations 4.6.3 Represent data (in tabular and/or graphical forms) so as to facilitate analysis and explanation of the data, and drawing of conclusions 4.6.4 Synthesize information and knowledge about the problem from the raw data to reach appropriate conclusions
PO 5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern ICT and IT tools including prediction and modeling to complex ICT activities with an understanding of the limitations.		
Competency		Indicators
5.4	Demonstrate an ability to identify/create modern ICT tools, techniques and resources	5.4.1 Identify modern ICT tools, techniques and resources for ICT activities 5.4.2 Create/adapt/modify/extend tools and techniques to solve ICT problems
5.5	Demonstrate an ability to select and apply discipline- specific tools, techniques and resources	5.4.3 Identify the strengths and limitations of tools for (i) acquiring information, (ii) modeling and simulating, (iii) monitoring system performance, and (iv) creating ICT designs. 5.4.4 Demonstrate proficiency in using discipline-specific tools
5.6	Demonstrate an ability to evaluate the suitability and limitations of tools used to solve an ICT problem	5.4.5 Discuss limitations and validate tools, techniques and resources 5.4.6 Verify the credibility of results from tool use with reference to the accuracy and limitations, and the assumptions inherent in their use.
PO 6: 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 ICT practice.		
Competency		Indicators
6.3	Demonstrate an ability to describe ICT roles in a broader context, e.g. pertaining to the environment, health, safety, legal and public welfare	6.3.1 Identify and describe various ICT roles; particularly as pertains to protection of the public and public interest at the global, regional and local level

6.4	Demonstrate an understanding of professional ICT regulations, legislation and standards	6.4.1 Interpret legislation, regulations, codes, and standards relevant to your discipline and explain its contribution to the protection of the public
PO 7: Environment and sustainability: Understand the impact of the professional ICT solutions in societal and environmental contexts, and demonstrate the knowledge of, and the need for sustainable development.		
Competency		Indicators
7.3	Demonstrate an understanding of the impact of ICT and industrial practices on social, environmental and in economic contexts	7.3.1 Identify risks/impacts in the life-cycle of an ICT product or activity 7.3.2 Understand the relationship between the technical, socio-economic and environmental dimensions of sustainability
7.4	Demonstrate an ability to apply principles of sustainable design and development	7.3.3 Describe management techniques for sustainable development 7.3.4 Apply principles of preventive ICT and sustainable development to an ICT activity or product relevant to the discipline
PO 8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the ICT practice.		
Competency		Indicators
8.3	Demonstrate an ability to recognize ethical dilemmas	8.3.1 Identify situations of unethical professional conduct and propose ethical alternatives
8.4	Demonstrate an ability to apply the Code of Ethics	8.4.1 Identify tenets of the ASME professional code of ethics 8.4.2 Examine and apply moral & ethical principles to known case studies
PO 9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.		
Competency		Indicators
9.4	Demonstrate an ability to form a team and define a role for each member	9.4.1 Recognize a variety of working and learning preferences; appreciate the value of diversity on a team 9.4.2 Implement the norms of practice (e.g. rules, roles, charters, agendas, etc.) of effective team work, to accomplish a goal.
9.5	Demonstrate effective individual and Team operations-communication, problem-solving, conflict resolution and leadership skills	9.5.1 Demonstrate effective communication, problem-solving, conflict resolution and leadership skills 9.5.2 Treat other team members respectfully 9.5.3 Listen to other members 9.5.4 Maintain composure in difficult situations
9.6	Demonstrate success in a team-based project	9.6.1 Present results as a team, with smooth integration of contributions from all individual efforts
PO 10: Communication: Communicate effectively on complex ICT activities with the ICT community and with the 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		
Competency		Indicators
10.4	Demonstrate an ability to comprehend technical literature and document project work	10.4.1 Read, understand and interpret technical and non-technical information 10.4.2 Produce clear, well-constructed, and well-supported written ICT documents 10.4.3 Create flow in a document or presentation - a logical progression of ideas so that the main point is clear
10.5	Demonstrate competence in listening, speaking, and presentation	10.4.4 Listen to and comprehend information, instructions, and viewpoints of others 10.4.5 Deliver effective oral presentations to technical and non-technical audiences
10.6	Demonstrate the ability to integrate different modes of communication	10.6.1 Create ICT-standard figures, reports and drawings to complement writing and presentations 10.6.2 Use a variety of media effectively to convey a message in a document or a presentation
PO 11: Project management and finance: Demonstrate knowledge and understanding of the ICT and management principles and apply these to one's work, as a member and leader in a team, to manage projects and in multidisciplinary environments.		
	Competency	Indicators

11.4	**Demonstrate an ability to evaluate the economic and financial performance of an ICT activity**	**11.4.1 Describe various economic and financial costs/benefits of an ICT activity** **11.4.2 Analyze different forms of financial statements to evaluate the financial status of an ICT project**
11.5	**Demonstrate an ability to compare and contrast the costs/ benefits of alternate proposals for an ICT activity**	**11.4.3 11.5.1 Analyze and select the most appropriate proposal based on economic and financial** **11.4.4 considerations**
11.6	**Demonstrate an ability to plan/manage an ICT activity within time and budget constraints**	**11.6.1 Identify the tasks required to complete an ICT activity, and the resources required to complete the tasks.** **11.6.2 Use project management tools to schedule an ICT project, so it is completed on time and on budget.**

PO 12: 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.

	Competency	**Indicators**
12.4	**Demonstrate an ability to identify gaps in knowledge and a strategy to close these gaps**	**12.4.1 Describe the rationale for the requirement for continuing professional development** **12.4.2 Identify deficiencies or gaps in knowledge and demonstrate an ability to source information to close this gap**
12.5	**Demonstrate an ability to identify changing trends in ICT knowledge and practice**	**12.4.3 Identify historic points of technological advance in ICT that required practitioners to seek education in order to stay current** **12.4.4 Recognize the need and be able to clearly explain why it is vitally important to keep** **12.4.5 current regarding new developments in your field**
12.6	**Demonstrate an ability to identify and access sources for new information**	**12.4.6 Source and comprehend technical literature and other credible sources of information** **12.4.7 Analyze sourced technical and popular information for feasibility, viability, sustainability, etc.**

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