BIRLA INSTITUTE OF TECHNOLOGY

CHOICE BASED CREDIT SYSTEM (CBCS) CURRICULUM

(Effective from Academic Session: Monsoon 2018)

BACHELOR IN COMPUTER APPLICATION

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Institute Vision

To become a Globally Recognised Academic Institution in consonance with the social, economic and ecological environment, striving continuously for excellence in education, research, and technological service to the National needs.

Institute Mission

- To educate students at Under Graduate, Post Graduate, Doctoral, and Post-Doctoral levels to perform challenging engineering and managerial jobs in industry.
- To provide excellent research and development facilities to take up Ph.D. programmes and research projects.
- To develop effective teaching learning skills and state of art research potential of the faculty.
- To build national capabilities in technology, education, and research in emerging areas.
- To provide excellent technological services to satisfy the requirements of the industry and overall academic needs of society.

Department Vision:

The department strives to be recognized globally for outstanding education and research, leading to excellent professionals and innovators in the field of Computer Science and Engineering, who can positively contribute to the society.

Department Mission:

1. To impart quality education and equip the students with strong foundation that could make them capable of handling challenges of the new century.

2. To maintain state of the art research facilities and facilitate interaction with world's leading universities, industries and research organization for constant improvement in the quality of education and research.

Graduate Attributes

1. **Engineering Knowledge**: Apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.

2. **Problem Analysis**: Identify, formulate, research literature and analyze complex engineering problems
reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

3. **Design/ Development of Solutions**: Design solutions for complex engineering problems and design system components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal and environmental considerations.

4. **Conduct investigations of complex problems** using research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions.

5. **Modern Tool Usage**: Create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

6. **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 engineering practice.

7. **Environment and Sustainability**: Understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate knowledge of and need for sustainable development.

8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.

9. **Individual and Team Work**: Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.

10. **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.

11. **Project Management and Finance**: Demonstrate knowledge and understanding of 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.

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.

Programme Educational Objectives (PEOs)

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **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.
3. **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
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.
5. **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.

(A) Programme Outcomes (POs)

Engineering Graduates will be able to:

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

2. **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.

3. **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.

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.

5. **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.

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 engineering practice.

7. **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.

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

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

10. **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.

11. **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.

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.

(B) Programme Specific Outcomes (PSOs)

13. The ability to analyze, design, code and test application specific or complex engineering problems in Cryptography and Network Security, Design and Analysis of Algorithm, Computer Networks, Cloud Computing, Mobile Computing, Data Mining and Big Data by applying the knowledge of basic sciences, engineering mathematics and engineering fundamentals.

14. The ability to adapt for rapid changes in tools and technology with an understanding of societal and ecological issues relevant to professional engineering practice through life-long learning.

15. Excellent adaptability to function in multi-disciplinary work environment, good interpersonal skills as a leader in a team in appreciation of professional ethics and societal responsibilities.

PROGRAMME COURSE STRUCTURE (ALL SEMESTERS)

BIRLA INSTITUTE OF TECHNOLOGY- MESRA, RANCHI
NEW COURSE STRUCTURE - To be effective from academic session 2018- 19
Based on CBCS & OBE model
Recommended scheme of study
(BACHELOR OF COMPUTER APPLICATIONS)

Semester/ Session of Study (Recomended)	Course Level	Course Code	Courses	Mode of delivery & credits *L-Lecture; T-Tutorial;P-Practicals*			Total Credits *C- Credits*
				L (*Periods/ week*)	**T** (*Periods/ week*)	**P** (*Periods/ week*)	**C**
			THEORY				
FIRST Monsoon	**FIRST**	CA101	Problem Solving and Programming in C	3	0	0	3
		CA103	Logical Organizations of Computers	3	1	0	4
		MT123	Business Communications	2	0	0	2
		CE101	Environmental Science	2	0	0	2
		CA104	Mathematics-I (Elementary Mathematics)	3	0	0	3
			LABORATORIES				
	FIRST	CA102	Problem Solving and Programming in C Lab	0	0	4	2
		PE(SEC-I)	Paper-I (Skill Enhancement Course)	0	0	4	2
TOTAL							**18**
SECOND Spring			**THEORY**				
	FIRST	CA155	Data Structures	3	1	0	4
		CA157	Discrete Structures	3	0	0	3
		CA160	Operating System Concepts	3	0	0	3
		CA158	Numerical and Statistical Methods	3	0	0	3
			LABORATORIES				
	FIRST	CA156	Data Structures Lab	0	0	4	2
		CA161	Operating System Lab	0	0	4	2
		CA159	Numerical and Statistical Methods Lab	0	0	4	2
		PE(SEC-II)	Paper-II (Skill Enhancement Course)	0	0	4	2
TOTAL							**21**

			THEORY				
THIRD **Monsoon**	**SECOND**	CA201	Object Oriented Programming using Java	3	0	0	3
		CA203	Database Management Systems	3	1	0	4
		**	Program Elective- I	3	1	0	4
			LABORATORIES				
	SECOND	CA202	OOP in Java Lab	0	0	4	2
		CA204	DBMS Lab	0	0	4	2
		**	PE1 Lab	0	0	4	2
		PE(SEC-III)	Paper-III (Skill Enhancement Course)	0	0	4	2
TOTAL							**19**
FOURTH **Spring**	**SECOND**		THEORY				
		CA255	Fundamentals of Computer Algorithms	3	1	0	4
		CA256	Web Programming	3	0	0	3
		CA258	Software Engineering	3	0	0	3
		**	Program Elective- II	3	1	0	4
			LABORATORIES				
	SECOND	CA257	Web Programming Lab	0	0	4	2
		CA259	Software Engineering Lab	0	0	4	2
		**	PE-II Lab	0	0	4	2
TOTAL							**20**
FIFTH **Monsoon**	**THIRD**		THEORY				
		CA301	Computer Graphics and Multimedia	3	0	0	3
		CA303	Computer Networks	3	0	0	3
		CA304	Management Information Systems	3	0	0	3
	SECOND	PE-III	Program Elective -III	3	0	1	4
	THIRD	PE-IV	Program Elective -IV	3	0	0	3
			LABORATORIES				
	THIRD	CA302	Computer Graphics Lab	0	0	4	2
	SECOND	**	PE-III Lab	0	0	4	2
	THIRD	PE(SEC-IV)	Paper-IV (Skill Enhancement Course)	0	0	4	2
TOTAL							**22**

			THEORY				
SIXTH **Spring**	**THIRD**	CA355	Data Mining	3	0	0	3
		CA356	Distributed Computing	3	0	0	3
	THIRD	**	Program Elective -V	3	1	0	4
	THIRD	**	Program Elective-VI	3	1	0	4
		CA360	Project	0	0	0	6
TOTAL							**20**
TOTAL PROGRAM CREDITS							**120**

LIST OF PROGRAM ELECTIVES							
PE/LEVEL		**Code No**	**Courses**	**Mode of delivery & credits** *L-Lecture; T-Tutorial;P-*			**Total Credits**
				L *(Periods/ week)*	**T** *(Periods/ week)*	**P** *(Periods/ week)*	**C**
2		CA220	Internet Technologies	3	1	0	4
2	**PEI**	CA221	Internet Technologies Lab	0	0	4	2
2		CA222	Mobile Application(MA)	3	1	0	4
2		CA223	Ecommerce Technology	3	1	0	4
2	**PEII**	CA272	Data Analytics	3	1	0	4
2		CA271	Soft Computing and Applications	3	1	0	4
2		CA272	Soft Computing Lab using MATLAB/SCI Lab	0	0	4	2
2		CA 273	Data Analytics	3	1	0	4
2		CA 274	Data Analytics Lab using R language	0	0	4	2
2		CA224	Cloud Computing	3	1	0	4
2	**PEIII**	CA275	Android Programming	3	1	0	4
		CA 276	Android Programming Lab	0	0	4	2
2		CA 277	Python Programming	3	1	0	4
2		CA 278	Python Programming Lab	0	0	4	2
3		CA320	Software Testing	3	0	0	3
3	**PEIV**	CA321	Software Testing Lab	0	0	4	2
3		CA322	Network Security	3	0	0	3
3		CA323	Cyber Forensics	3	1	0	4
3	**PEV**	CA325	Unix and Shell Programming	3	1	0	4
3		CA326	Unix and Shell Programming Lab	0	0	4	2
3		CA327	System Programming	3	1	0	4

3	PEVI	CA328	Distributed Database Systems	3	1	0	4
3		CA331	Decision Support System	3	1	0	4

PROGRAM ELECTIVES (LIST OF SKILL DEVELOPMENT COURSES)

PE/LEVEL		Code No	Subjects	Mode of delivery & credits *L-Lecture; T-Tutorial;P-*			Total Credits
				L *(Periods/ week)*	T *(Periods/ week)*	P *(Periods/ week)*	C
1	PE(SEC-I)	CA180	Office Automation Tools	0	0	4	2
1	PE(SEC-II)	CA181	Designing and Publishing in Computer Using Page maker, Photoshop and Corel draw	0	0	4	2
2		CA280	HTML Programming	0	0	4	2
2	PE(SEC-III)	CA281	Programming in Visual Basic/GAMBAS	0	0	4	2
2		CA284	Programming in SCILAB	0	0	4	2
3	PE(SEC-IV)	CA380	Tally Software (Accounting and FinanceTally ERP)	0	0	4	2
3		CA381	Photo Shop Lab	0	0	4	2