



Nagarjuna College of Engineering & Technology, Bengaluru

An Autonomous Institute, Affiliated to VTU Belagavi

Scheme & Syllabus of III & IV Sem ISE

**As per the NEP 2020 Guidelines,
Choice-Based Credit System
&
Outcome-Based Education**

Information Science & Engineering

w.e.f.

Academic Year 2022-2023

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY, BENGALURU

B.E. in Information Science & Engineering

Scheme of Teaching and Examination 2021-22 as per NEP 2020

Outcome-Based Education (OBE) and Choice Based Credit System (CBCS)

(Effective from the Academic Year 2021-22)

III SEMESTER													
Sl. No.	Course and Course Code		Course Title	Teaching Department	Teaching Hours / Week				Duration in Hours	Examination			
					Theory / Lecture	Tutorial	Practical / Drawing	Self-study Component		CIE Marks	SEE Marks	Total Marks	Credits
					L	T	P	S					
1	BSC	21MAT31	Transform Calculus, Fourier Series and Numerical Techniques	Maths	2	2	0	0	3	50	50	100	3
2	IPCC	21ISI32	Data Structures and Its Applications	CSEB	3	0	2	0	3	50	50	100	4
3	IPCC	21ISI33	Database Concepts using SQL	CSEB	3	0	2	0	3	50	50	100	4
4	PCC	21IST34	Logic Design & Computer Organization	CSEB	3	0	0	0	3	50	50	100	3
5	PCC	21ISL35	Object Oriented Programming with JAVA Lab	CSEB	0	0	2	0	3	50	50	100	1
6	UHV	21UHV36	Social Connect and Responsibility	Any Dept	1	0	0	0	1	50	50	100	1
7	HSMC	21KSK37 21KKB37	Samskrutika Kannada / Balake Kannada	HSMC	1	0	0	0	1	50	50	100	1
8	AEC	21AEC38X	Ability Enhancement Course - III	Any Dept	1	0	0	0	1	50	50	100	1
9	EDC	21EDC39	Entrepreneurship Development Course - 1	ISE / EDC	0	2	0	0	1	Audit Course			
TOTAL					14	4	6	0	19	400	400	800	18
10	Scheduled activities for III to VIII semesters (NMDC)	21NS83	National Service Scheme (NSS)	NSS	All students have to register for any one of the courses namely National Service Scheme, Physical Education (PE) (Sports and Athletics) and Yoga with the concerned coordinator of the course during the first week of III semester. The activities shall be carried out from (for 5 semesters) between III semester to VIII semester. SEE in the above courses shall be conducted during VIII semester examinations and the accumulated CIE marks shall be added to the SEE marks. Successful completion of the registered course is mandatory for the award of the degree. The events shall be appropriately scheduled by the colleges and the same shall be reflected in the colander prepared for the NSS, PE and Yoga activities.								
		21PE83	Physical Education (PE) (Sports and Athletics)	PE									
		21Y083	Yoga	Yoga									
Course prescribed to lateral entry Diploma holders admitted to III semester B.E./B.Tech programs													
1	NCMC	21MATDIP31	Additional Mathematics - I	Maths	2	2	--	--	--	100	--	100	0

Note: **BSC:** Basic Science Course, **PCC:** Professional Core Course, **HSMC:** Humanity and Social Science & Management Courses, **AEC** –Ability Enhancement Courses. **INT**–Internship, **UHV**- Universal Human Value Courses, **IPCC:** Integrated Professional Core Course, **CSEB** – Computer Science and Engineering Board (CS / IS / AI / AD/ IC / CD).

L–Lecture, **T**–Tutorial, **P**–Practical/Drawing, **S**–Self Study Component, **CIE:** Continuous Internal Evaluation, **SEE:** Semester End Examination

21KSK37/47 Samskrutika Kannada is for students who speak, read and write Kannada and **21KBK37/47** Balake Kannada is for non-Kannada speaking, reading, and writing students.

Integrated Professional Core Course (IPCC): Refers to Professional Theory Core Course Integrated with Practical's of the same course. Credit for IPCC can be 04 and its Teaching–Learning hours (L : T : P) can be considered as (3 : 0 : 2) or (2 : 2 : 2). The theory part of the IPCC shall be evaluated both by CIE and SEE. The practical part shall be evaluated by only CIE (no SEE). However, questions from the practical part of IPCC shall be included in the SEE question paper. For more details, the regulation governing the Degree of Bachelor of Engineering /Technology (BE/B.Tech.) 2021-22 may be referred.

21INT49 Inter/Intra Institutional Internship: All the students admitted to engineering programs under the lateral entry category shall have to undergo a mandatory 21INT49 Inter/Intra Institutional Internship of 03 weeks during the intervening period of III and IV semesters. The internship shall be slated for CIE only and will not have SEE. The letter grade earned through CIE shall be included in the IV semester grade card. The internship shall be considered as a head of passing and shall be considered for vertical progression and for the award of degree. Those, who do not take up / complete the internship shall be declared fail and shall have to complete during subsequently after satisfying the internship requirements. The faculty coordinator or mentor shall monitor the students' internship progress and interact with them for the successful completion of the internship.

Non-credit mandatory courses (NCMC):

(A) Additional Mathematics I and II:

(1) These courses are prescribed for III and IV semesters respectively to lateral entry Diploma holders admitted to III semester of B.E./B.Tech., programs. They shall attend the classes during the respective semesters to complete all the formalities of the course and appear for the Continuous Internal Evaluation (CIE). In case, any student fails to register for the said course/fails to secure the minimum 40 % of the prescribed CIE marks, he/she shall be deemed to have secured an F grade. In such a case, the student has to fulfil the course requirements during subsequent semester/s to earn the qualifying CIE marks. These courses are slated for CIE only and has no SEE.

(2) Additional Mathematics I and II shall not be considered for vertical progression as well as for the calculation of SGPA and CGPA, but completion of the courses shall be mandatory for the award of degree.

(3) Successful completion of the courses Additional Mathematics I and II shall be indicated as satisfactory in the grade card. Non-completion of the courses Additional Mathematics I and II shall be indicated as Unsatisfactory.

(B) National Service Scheme/Physical Education (Sport and Athletics)/ Yoga:

(1) Securing 40 % or more in CIE,35 % or more marks in SEE and 40 % or more in the sum total of CIE + SEE leads to successful completion of the registered course.

(2) In case, students fail to secure 35 % marks in SEE, they have to appear for SEE during the subsequent examinations conducted by the University.

(3) In case, any student fails to register for NSS, PE or Yoga/fails to secure the minimum 40 % of the prescribed CIE marks, he/she shall be deemed to have not completed the requirements of the course. In such a case, the student has to fulfil the course requirements during subsequent semester/s to earn the qualifying CIE marks.

(4) Successful completion of the course shall be indicated as satisfactory in the grade card. Non-completion of the course shall be indicated as Unsatisfactory.

(5) These courses shall not be considered for vertical progression as well as for the calculation of SGPA and CGPA, but completion of the courses shall be mandatory for the award of degree.

Ability Enhancement Course - III

21ISL381

Mastering Office

21ISL382

C++ Programming

21ISL383

Data Analysis and Computer Application

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY, BENGALURU
B.E. in Information Science & Engineering
 Scheme of Teaching and Examination 2021-22
 Outcome-Based Education (OBE) and Choice Based Credit System (CBCS)
 (Effective from the Academic Year 2021-22)

IV SEMESTER													
Sl. No.	Course and Course Code		Course Title	Teaching Department	Teaching Hours / Week				Duration in Hours	Examination			
					Theory / Lecture	Tutorial	Practical / Drawing	Self-study Component		CIE Marks	SEE Marks	Total Marks	Credits
					L	T	P	S					
1	BSC	21MAT41	Mathematical Foundations for Computing	Maths	2	2	0	0	3	50	50	100	3
2	IPCC	21ISI42	Design and Analysis of Algorithms	CSEB	3	0	2	0	3	50	50	100	4
3	IPCC	21ISI43	Computer Networks	CSEB	3	0	2	0	3	50	50	100	4
4	PCC	21IST44	Operating System	CSEB	3	0	0	0	3	50	50	100	3
5	AEC	21AEC45	Biology for Engineers	BT/BSC / CSEB	2	0	0	0	2	50	50	100	2
6	PCC	21ISL46	Python Programming Lab	CSEB	0	0	2	0	3	50	50	100	1
7	HSMC	21CIP47	Constitution of India, Professional Ethics and Cyber Law	HSMC	1	0	0	0	1	50	50	100	1
8	AEC	21AEC48X	Ability Enhancement Course – IV	Any Dept	1	0	0	0	1	50	50	100	1
9	UHV	21UHV49	Universal Human Values	Any Dept.	1	0	0	0	1	50	50	100	1
10	INT	21INT49	Inter/Intra Institutional Internship	Completed during the intervening period of II and III semesters by students admitted to first year of BE./B.Tech. and during the intervening period of III and IV semesters by Lateral entry students admitted to III semester. Evaluation by the appropriate authorities					3	100	--	100	2
11	EDC	21EDC49	Entrepreneurship Development Course – 2	ISE / EDC	0	2	0	0	1	Audit Course			
TOTAL					16	4	6	0	21	550	450	1000	22
Course prescribed to lateral entry Diploma holders admitted to III semester of Engineering programs													
1	NCMC	21MATDIP41	Additional Mathematics - II	Maths	2	2	--	--	--	100	--	100	0

Note: **BSC:** Basic Science Course, **PCC:** Professional Core Course, **HSMC:** Humanity and Social Science & Management Courses, **AEC** –Ability Enhancement Courses. **INT**–Internship, **UHV**- Universal Human Value Courses, **IPCC:** Integrated Professional Core Course, **CSEB** – Computer Science and Engg. Board (CS / IS / AI / AD/ IC / CD)
L–Lecture, **T**–Tutorial, **P**–Practical/Drawing, **S**–Self Study Component, **CIE:** Continuous Internal Evaluation, **SEE:** Semester End Examination

21KSK37/47 Samskrutika Kannada is for students who speak, read and write Kannada and **21KKBK37/47** Balake Kannada is for non-Kannada speaking, reading, and writing students.

Integrated Professional Core Course (IPCC): Refers to Professional Theory Core Course Integrated with Practical's of the same course. Credit for IPCC can be 04 and its Teaching-Learning hours (L : T : P) can be considered as (3 : 0 : 2) or (2 : 2 : 2). The theory part of the IPCC shall be evaluated both by CIE and SEE. The practical part shall be evaluated by only CIE (no SEE). However, questions from the practical part of IPCC shall be included in the SEE question paper. For more details, the regulation governing the Degree of Bachelor of Engineering /Technology (BE/B.Tech.) 2021-22 may be referred.

Non-credit mandatory courses (NCMC):

(A) Additional Mathematics I and II:

(1) These courses are prescribed for III and IV semesters respectively to lateral entry Diploma holders admitted to III semester of B.E./B.Tech., programs. They shall attend the classes during the respective semesters to complete all the formalities of the course and appear for the Continuous Internal Evaluation (CIE). In case, any student fails to register for the said course/fails to secure the minimum 40 % of the prescribed CIE marks, he/she shall be deemed to have secured an F grade. In such a case, the student has to fulfill the course requirements during subsequent semester/s to earn the qualifying CIE marks. These courses are slated for CIE only and has no SEE.

(2) Additional Mathematics I and II shall not be considered for vertical progression as well as for the calculation of SGPA and CGPA, but completion of the courses shall be mandatory for the award of degree.

(3) Successful completion of the courses Additional Mathematics I and II shall be indicated as satisfactory in the grade card. Non-completion of the courses Additional Mathematics I and II shall be indicated as Unsatisfactory.

(B) National Service Scheme/Physical Education (Sport and Athletics)/ Yoga:

(1) Securing 40 % or more in CIE, 35 % or more marks in SEE and 40 % or more in the sum total of CIE + SEE leads to successful completion of the registered course.

(2) In case, students fail to secure 35 % marks in SEE, they have to appear for SEE during the subsequent examinations conducted by the University.

(3) In case, any student fails to register for NSS, PE or Yoga/fails to secure the minimum 40 % of the prescribed CIE marks, he/she shall be deemed to have not completed the requirements of the course. In such a case, the student has to fulfill the course requirements during subsequent semester/s to earn the qualifying CIE marks.

(4) Successful completion of the course shall be indicated as satisfactory in the grade card. Non-completion of the course shall be indicated as Unsatisfactory.

(5) These courses shall not be considered for vertical progression as well as for the calculation of SGPA and CGPA, but completion of the courses shall be mandatory for the award of degree.

Ability Enhancement Course - III

21ISL481	Web Programming
21ISL482	Unix Shell Programming
21ISL483	R Programming

Internship of 04 weeks during the intervening period of IV and V semesters; 21INT68 Innovation/ Entrepreneurship/ Societal based Internship.

(1) All the students shall have to undergo a mandatory internship of 04 weeks during the intervening period of IV and V semesters. The internship shall be slated for CIE only and will not have SEE. The letter grade earned through CIE shall be included in the VI semester grade card. The internship shall be considered as a head of passing and shall be considered for vertical progression and for the award of degree. Those, who do not take up / complete the internship shall be considered under F (fail) grade and shall have to complete during subsequently after satisfying the internship requirements.

(2) Innovation/ Entrepreneurship Internship shall be carried out at industry, State and Central Government /Non-government organizations (NGOs), micro, small and medium enterprise (MSME), Innovation centres or Incubation centres. Innovation need not be a single major breakthrough; it can also be a series of small or incremental changes. Innovation of any kind can also happen outside of the business world. Entrepreneurship internships offers a chance to gain hands on experience in the world of entrepreneurship and helps to learn what it takes to run a small entrepreneurial business by performing intern duties with an established company. This experience can then be

applied to future business endeavours. Start-ups and small companies are a preferred place to learn the business ticks for future entrepreneurs as learning how a small business operates will serve the intern well when he/she manages his/her own company. Entrepreneurship acts as a catalyst to open the minds to creativity and innovation. Entrepreneurship internship can be from several sectors, including technology, small and medium-sized, and the service sector.

(3) Societal or social internship.

Urbanization is increasing on a global scale; and yet, half the world's population still resides in rural areas and is devoid of many things that urban population enjoy. Rural internship, is a work-based activity in which students will have a chance to solve/reduce the problems of the rural place for better living. As proposed under the AICTE rural internship programme, activities under Societal or social internship, particularly in rural areas, shall be considered for 40 points under AICTE activity point programme.