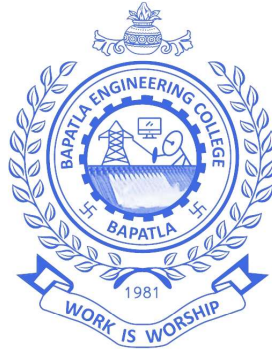


# Bapatla Engineering College

( Autonomous )



## *B.Tech*

**Information Technology**  
**Curriculum Effective from A.Y. 2020-21**  
**(R20 Regulation)**



## **Bapatla Engineering College :: Bapatla**

(Autonomous under Acharya Nagarjuna University)

(Sponsored by Bapatla Education Society)

BAPATLA - 522102 Guntur District, A.P., INDIA

[www.becbapatla.ac.in](http://www.becbapatla.ac.in)

Table 1: Distribution of Credits across Course Categories

S.No.	Category	Code	Credits		
			Proposed	APSCHE	AICTE
1	Humanities & Social Science including Management Courses	HSMC	10.5	10.5	12.0
2	Basic Science Courses	BSC	18.0	21.0	25.0
3	Engineering Science courses	ESC	22.5	24.0	24.0
4	Professional Core Courses	PCC	48.0	51.0	48.0
5	Professional Elective Courses	PEC	12.0	15.0	18.0
6	Open/Job Oriented Elective Courses	JOEC	16.5	12.0	18.0
7	Internship, Seminar & Project work	PROJ	16.5	16.5	15.0
8	Skill Oriented Courses	SC	16.0	10.0	-
9	Mandatory Courses	MC		non-credit	
<b>Total Credits</b>			160	160	160



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**First Year, I Semester**

Course Code	Category	Course Title	Scheme of Instruction (Hours per week)				Scheme of Examination (Maximum marks)			No of Credits
			L	T	P	Total	CIE	SEE	Total	
20IT101 /MA01	BS	Linear Algebra and Ordinary Differential Equations	2	1	0	3	30	70	100	3
20IT102 /CY01	BS	Engineering Chemistry	3	0	0	3	30	70	100	3
20IT103 /EE01	ES	Basic Electrical and Electronics Engineering	3	0	0	3	30	70	100	3
20ITL101 /MEL01	ES	Engineering Graphics	1	0	4	5	30	70	100	3
20ITL102 /CYL01	BS	Chemistry Lab	0	0	3	3	30	70	100	1.5
20ITL103 /EEL01	ES	Basic Electrical and Electronics Engineering Lab	0	0	3	3	30	70	100	1.5
20ITL104	ES	IT Workshop	0	0	3	3	30	70	100	1.5
20IT104 /MC01	MC	Environmental Studies	2	0	0	2	30	0	30	0
<b>TOTAL</b>			<b>11</b>	<b>1</b>	<b>13</b>	<b>25</b>	<b>240</b>	<b>490</b>	<b>730</b>	<b>16.5</b>
Induction Program	First Three Weeks (Physical activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Familiarization to Dept./Branch & Innovations)									

**CIE:** Continuous Internal Evaluation    **SEE:** Semester End Examination

**L :** Lecture

**T :** Tutorial

**P :** Practical



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**First Year, I Semester**

Course Code	Category	Course Title	Scheme of Instruction (Hours per week)				Scheme of Examination (Maximum marks)			No of Credits
			L	T	P	Total	CIE	SEE	Total	
20IT101 /MA01	BS	Linear Algebra and Ordinary Differential Equations	2	1	0	3	30	70	100	3
20IT102 /CY01	BS	Engineering Chemistry	3	0	0	3	30	70	100	3
20IT103 /EE01	ES	Basic Electrical and Electronics Engineering	3	0	0	3	30	70	100	3
20ITL101 /MEL01	ES	Engineering Graphics	1	0	4	5	30	70	100	3
20ITL102 /CYL01	BS	Chemistry Lab	0	0	3	3	30	70	100	1.5
20ITL103 /EEL01	ES	Basic Electrical and Electronics Engineering Lab	0	0	3	3	30	70	100	1.5
20ITL104 /MEL02	ES	Workshop Practice	0	0	3	3	30	70	100	1.5
20IT104 /MC01	MC	Environmental Studies	2	0	0	2	30	0	30	0
<b>TOTAL</b>			<b>11</b>	<b>1</b>	<b>13</b>	<b>25</b>	<b>240</b>	<b>490</b>	<b>730</b>	<b>16.5</b>
Induction Program	First Three Weeks (Physical activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Familiarization to Dept./Branch & Innovations)									

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**First Year, II Semester**

Course Code	Category	Course Title	Scheme of Instruction (Hours per week)				Scheme of Examination (Maximum marks)			No of Credits
			L	T	P	Total	CIE	SEE	Total	
20IT201 /MA02	BS	Numerical Methods and Advanced Calculus	2	1	0	3	30	70	100	3
20IT202 /PH03	BS	Semiconductor Physics and Nanomaterials	3	0	0	3	30	70	100	3
20IT203 /EL01	HS	Communicative English	3	0	0	3	30	70	100	3
20IT204 /CS01	ES	Programming for Problem Solving	2	1	0	3	30	70	100	3
20IT205 /CC01	ES	Digital Logic Design	3	0	0	3	30	70	100	3
20IT206 /CC02	ES	Discrete Mathematics	3	0	0	3	30	70	100	3
20ITL201 /PHL02	BS	Semiconductor Physics Lab	0	0	3	3	30	70	100	1.5
20ITL202 /ELL01	HS	English Communication Skills Lab	0	0	3	3	30	70	100	1.5
20ITL203 /CSL01	ES	Programming for Problem Solving Lab	0	0	3	3	30	70	100	1.5
NSS	-	National Service Scheme	-	-	-	-	-	-	-	-
<b>TOTAL</b>			<b>16</b>	<b>2</b>	<b>12</b>	<b>30</b>	<b>270</b>	<b>630</b>	<b>900</b>	<b>22.5</b>



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**Second Year, III Semester**

Course Code	Category	Course Title	Scheme of Instruction (Hours per week)				Scheme of Examination (Maximum marks)			No of Credits
			L	T	P	Total	CIE	SEE	Total	
20IT301	ES	Microprocessor and Microcontrollers	3	0	0	3	30	70	100	3
20IT302 /CC03	PC	Data Structures	2	1	0	3	30	70	100	3
20IT303 /CC04	PC	Object Oriented Programming	2	1	0	3	30	70	100	3
20IT304 /CC05	PC	Operating Systems	3	0	0	3	30	70	100	3
20IT305 /CC06	PC	Computer Organization	3	0	0	3	30	70	100	3
20IT306 /EL02	HS	Technical English	3	0	0	3	30	70	100	3
20ITL301 /SOC1	SO	Linux Essentials (Skill Oriented Course-I)	2	0	3	5	30	70	100	3.5
20ITL302 /CC07	PC	Data Structures Lab	0	0	3	3	30	70	100	1.5
20ITL303 /CC08	PC	Object Oriented Programming Lab	0	0	3	3	30	70	100	1.5
<b>TOTAL</b>			<b>18</b>	<b>2</b>	<b>9</b>	<b>29</b>	<b>270</b>	<b>630</b>	<b>900</b>	<b>24.5</b>



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**Second Year, IV Semester**

Course Code	Category	Course Title	Scheme of Instruction (Hours per week)				Scheme of Examination (Maximum marks)			No of Credits
			L	T	P	Total	CIE	SEE	Total	
20IT401 /MA03	BS	Probability and Statistics	2	1	0	3	30	70	100	3
20IT402 /CC09	PC	Web Technologies	3	0	0	3	30	70	100	3
20IT403 /CC10	PC	Database Management Systems	3	0	0	3	30	70	100	3
20IT404 /CC11	PC	Design and Analysis of Algorithms	2	1	0	3	30	70	100	3
20ITL401 /SOC2	SO	Python Programming (Skill Oriented Course-II)	2	0	3	5	30	70	100	3.5
20ITL402 /CC12	PC	Web Technologies Lab	0	0	3	3	30	70	100	1.5
20ITL403 /CC13	PC	RDBMS Lab	0	0	3	3	30	70	100	1.5
20IT405 /MC02	MC	Professional Ethics & Human Values	2	0	0	2	30	0	30	0
<b>Total</b>			<b>14</b>	<b>2</b>	<b>9</b>	<b>25</b>	<b>240</b>	<b>490</b>	<b>730</b>	<b>18.5</b>
20ITH4 20ITM4	<b>Honors(Set I) / Minor(Set II) Course</b>		<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>	<b>30</b>	<b>70</b>	<b>100</b>	<b>4</b>



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**Third Year, V Semester**

Course Code	Category	Course Title	Scheme of Instruction (Hours per week)				Scheme of Examination (Maximum marks)			No of Credits
			L	T	P	Total	CIE	SEE	Total	
20IT501 /CC14	PC	Automata Theory & Formal Languages	2	1	0	3	30	70	100	3
20IT502 /CC15	PC	Computer Networks	3	0	0	3	30	70	100	3
20IT503 /CC16	PC	Software Engineering	3	0	0	3	30	70	100	3
20IT504 /PE1	PE	Professional Elective-I	3	0	0	3	30	70	100	3
20IT505 /JO1	JO	Job Oriented Elective-I	3	0	0	3	30	70	100	3
20ITL501 /SOC3	SO	Soft Skills (Skill Oriented Course-III)	1	0	2	3	30	70	100	2
20ITL502 /CC17	PC	Software Engineering Lab	0	0	3	3	30	70	100	1.5
20ITL503 /JOL1	JO	Job Oriented Elective Lab-I	0	0	3	3	30	70	100	1.5
20ITL504 /INT01	INT	Summer Internship*	-	-	-	-	-	100	100	1.5
20IT506 /MC04	MC	Essence of Indian Traditional Knowledge	2	0	0	2	30	0	30	0
<b>Total</b>			<b>17</b>	<b>1</b>	<b>8</b>	<b>26</b>	<b>270</b>	<b>560</b>	<b>830</b>	<b>21.5</b>
20ITH5 20ITM5	<b>Honors(Set I) / Minor(Set II) Course</b>		<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>	<b>30</b>	<b>70</b>	<b>100</b>	<b>4</b>



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<b>Professional Elective-I</b>		<b>Job Oriented Elective-I (Theory and Lab)</b>	
1A	Artificial Intelligence	1A	Mobile Application Development
1B	Digital Image Processing	1B	Data Analytics
1C	User Interface / User Experience Design	1C	Computer Animation & Game Design

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**\* To be completed after IV semester during summer vacation and is evaluated in V semester**

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**Third Year, VI Semester**

Course Code	Category	Course Title	Scheme of Instruction (Hours per week)				Scheme of Examination (Maximum marks)			No of Credits
			L	T	P	Total	CIE	SEE	Total	
20IT601 /CC18	PC	Compiler Design	3	0	0	3	30	70	100	3
20IT602 /CC19	PC	Machine Learning	2	1	0	3	30	70	100	3
20IT603 /CC20	PC	Cryptography and Network Security	3	0	0	3	30	70	100	3
20IT604 /PE2	PE	Professional Elective-II	3	0	0	3	30	70	100	3
20IT605 /JO2	JO	Job Oriented Elective-II	3	0	0	3	30	70	100	3
20ITL601 /SOC4	SO	Full Stack Development (Skill Advanced Course-I)	2	0	3	5	30	70	100	3.5
20ITL602 /CC21	PC	Machine Learning Lab	0	0	3	3	30	70	100	1.5
20ITL603 /JOL2	JO	Job Oriented Elective Lab-II	0	0	3	3	30	70	100	1.5
20IT606 /MC03	MC	Indian Constitution	2	0	0	2	30	0	30	0
<b>Total</b>			<b>18</b>	<b>1</b>	<b>9</b>	<b>28</b>	<b>270</b>	<b>560</b>	<b>830</b>	<b>21.5</b>
20ITH6 20ITM6	<b>Honors(Set I) / Minor(Set II) Course</b>		<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>	<b>30</b>	<b>70</b>	<b>100</b>	<b>4</b>

Professional Elective-II		Job Oriented Elective-II (Theory and Lab)	
2A	Data Warehousing & Data Mining	2A	Enterprise Programming
2B	Robotic Process Automation	2B	Middleware Technologies
2C	Protocols for Secure Electronic Commerce	2C	Industrial IOT



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**Final Year, VII Semester**

Course Code	Category	Course Title	Scheme of Instruction (Hours per week)				Scheme of Examination (Maximum marks)			No of Credits
			L	T	P	Total	CIE	SEE	Total	
20IT701 /PE3	PE	Professional Elective-III	3	0	0	3	30	70	100	3
20IT702 /PE4	PE	Professional Elective-IV	3	0	0	3	30	70	100	3
20IT703 /JO3	JO	Job Oriented Elective-III	3	0	0	3	30	70	100	3
20IT704 /O	OE	Open Elective	3	0	0	3	30	70	100	3
20IT705 /ME01	HS	Industrial Management & Entrepreneurship Development	3	0	0	3	30	70	100	3
20ITL701 /SOC5	SO	DevOps (Skill Advanced Course-II)	2	0	3	5	30	70	100	3.5
20ITL702 /JOL	JO	Job Oriented Elective Lab-III	0	0	3	3	30	70	100	1.5
20ITL703 /INT02	INT	Industrial / Research Internship	-	-	-	-	-	100	100	3
<b>Total</b>			<b>14</b>	<b>0</b>	<b>6</b>	<b>20</b>	<b>180</b>	<b>420</b>	<b>600</b>	<b>23</b>
20ITH7 20ITM7	<b>Honors(Set I) / Minor(Set II) Course</b>		<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>	<b>30</b>	<b>70</b>	<b>100</b>	<b>4</b>

<b>Professional Elective-III</b>		<b>Professional Elective-IV</b>	
3A	Wireless Networks	4A	Block Chain Technologies
3B	Distributed Systems	4B	Bigdata Analytics
3C	Natural Language Processing	4C	Immersive Technologies

<b>Job Oriented Elective-III (Theory and Lab)</b>	
3A	Cloud Programming
3B	Cyber Security
3C	Software Testing Methodologies



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**Final Year, VIII Semester**

Course Code	Category	Course Title	Scheme of Instruction (Hours per week)				Scheme of Examination (Maximum marks)			No of Credits
			L	T	P	Total	CIE	SEE	Total	
20IT801 /PW	PW	Project Work	0	0	24	24	50	100	150	12
<b>Total</b>			<b>0</b>	<b>0</b>	<b>24</b>	<b>24</b>	<b>50</b>	<b>100</b>	<b>150</b>	<b>12</b>
20ITHM1 20ITMM1	<b>Honors / Minor Course (MOOCS-1)</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>
20ITHM2 20ITMM2	<b>Honors / Minor Course (MOOCS-2)</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>

**CIE:** Continuous Internal Evaluation    **SEE:** Semester End Examination

**L :** Lecture                      **T :** Tutorial    **P :** Practical

Table 2: Set I, Additional courses offered to B.Tech., IT students to obtain Honors degree in Information Technology

<b>Code</b>	<b>Title</b>	<b>Prerequisites</b>
A	Advanced Data Structures	Data Structures (20IT302/CC03)
B	Advanced Computer Architecture	Computer Organization (20IT305/CC06)
C	Graph Theory	Data Structures (20IT302/CC03)
D	Numerical Optimization	None
E	Advanced Database Management Systems	Database Management Systems (20IT403/CC10)
F	Real Time Operating Systems	Operating Systems (20IT304/CC05)
G	Parallel Algorithms	Design and Analysis of Algorithms (20IT404/CC11)
H	Embedded Systems	Operating Systems (20IT304/CC05) and Microprocessor and Microcontrollers (20IT301)
I	Software Project Management	Software Engineering (20IT503/CC16)
J	Storage Area Networks	Operating Systems (20IT304/CC05) and Database Management Systems (20IT403/CC10)
K	Computational Complexity	Design and Analysis of Algorithms (20IT404/CC11)
L	Competitive Programming	Object Oriented Programming (20IT303/CC04)
M	Game Theory	None
N	Spatial Informatics	Database Management Systems (20IT403/CC10)
O	Deep Learning	Machine Learning (20IT602/CC19)

Table 3: Set II, Courses offered to non CSE and IT branch B.Tech., students for obtaining Minor degree in Information Technology

<b>Code</b>	<b>Title</b>	<b>Prerequisites</b>
A	Computer System Architecture	None
B	Operating Systems	None
C	Data Structures	Programming for Problem Solving (CS01)
D	Object Oriented Programming	Programming for Problem Solving(CS01)
E	Discrete Mathematics	None
F	Design and Analysis of Algorithms	Programming for Problem Solving (CS01)
G	Database Management Systems	None
H	Computer Networks	None

Table 4: Set III, Open Elective Courses. A student can choose a course which is not offered by the parent and its allied departments

<b>Code</b>	<b>Offered by</b>	<b>Title</b>
CM1	AIML	Artificial Intelligence
CM2	AIML	Introduction to Machine Learning
CE1	Civil	Air Pollution and Control
CE2	Civil	Remote Sensing and GIS
CB1	CB	Digital Forensics
CB2	CB	Introduction to Information Security and Cyber Laws
CS1	CSE	Database Management System
CS2	CSE	Java Programming
DS1	DS	Data Warehousing and Data Mining
DS2	DS	Social Network Analysis
EC1	ECE	Digital Image Processing
EC2	ECE	Embedded System & Design
EEE1	EEE	Non Conventional Energy Sources
EEE2	EEE	Electrical Energy Conservation and Auditing
EEE3	EEE	Industrial Electrical Systems
EI1	EI	Sensors and Signal Conditioning
IT1	IT	Cyber Security
IT2	IT	Web Technologies
ME1	MECH	Automobile Engineering
ME2	MECH	Renewable energy sources
ME3	MECH	Project Management
ME4	MECH	Entrepreneurship Development
CY1	Chemistry	Chemistry in Space technology
CY2	Chemistry	Artificial Intelligence in Sustainable Chemistry
CY3	Chemistry	Material Chemistry in daily life
EL1	English	Professional Communication
MA1	Maths	Graph Theory
MA2	Maths	Linear Algebra
PH1	Physics	Nanomaterials and Technology
PH2	Physics	Optoelectronic devices and applications
PH3	Physics	Fiber optics communication
NCC	NCC	National Cadet Corps