



# **COLLEGE OF ENGINEERING AND TECHNOLOGY, BAMBHORI POST BOX NO. 94, JALGAON – 425001. (M.S.)**

**(With NBA Accredited Programmes)**

Website : [www.sscoetjalgaon.ac.in](http://www.sscoetjalgaon.ac.in)

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## **Mandatory Disclosure**

### **Part-II**

**January 2020**



### **Computing Facilities existing for the existing Programs**

<b>Sr. No.</b>	<b>Particulars</b>	<b>Availability</b>
01.	No of Computer Terminals	Available as per AICTE norms
02.	Hardware Specification	Dual Core and Higher Specifications
03.	No of Terminals on LAN/WAN	Available as per AICTE norms
04.	Relevant Legal Software	<ul style="list-style-type: none"><li>• System software packages:- Available as per AICTE norms</li><li>• Application software packages:- Available as per AICTE norms</li></ul>
05.	Peripherals / Printers	<ul style="list-style-type: none"><li>• Printers= 85</li><li>• Scanners = 9</li></ul>
06.	Internet Accessibility (in kbps & hrs)	<ul style="list-style-type: none"><li>• Leased Line = 68 MBPS</li></ul>

**College is having Wireless and OFC Connectivity throughout the Campus**

**Microsoft Open value subscription education solutions**





## SSBT's COLLEGE OF ENGINEERING & TECH. BAMBHORI, JALGAON.

### DEPARTMENT OF PHYSICAL EDUCATION

#### Sports Facilities Available

##### a) List of outdoor facilities:-

Sr. No	Games	Area	Facility
01	Football	102m*68m	Playground (01)
02	Cricket	50 Yards(45m radius)	Playground (01)
03	Volleyball	9m*18m	Playground (02)
04	Basketball	28m*15m	Basketball Court(01)
05	Kho-Kho	29m*16m, 25m*14m	Playground (01)
06	Kabaddi	13m*10m, 12m*10m	Playground (02)
07	Handball	40m*20m	Playground(01)
08	Athletics	300m Track	Playground(01)
09	Archery	50m Range	Playground(01)
10	Hockey	45m*90m	Playground(01)

##### b) List of indoor facilities:-

01	Badminton Court	13.40m *6.10m	Separate for Boys & Girls
02	Gymnasium	NA	Common for Boys & Girls
03	Table Tennis	NA	Separate for Boys & Girls
04	Chess	NA	Separate for Boys & Girls
05	Carom	NA	Separate for Boys & Girls
06	Billiards	NA	For Students & Staff
07	Fencing	NA	Yoga Hall

##### c) Total Ground Area:-

01	Details	Available Area (sq.mtr.)
02	Play Ground	12,204
03	Basket ball Court	1,140
04	Gym and Sports Office	226
05	Bad Minton court	988
06	<b>Total</b>	<b>14,558 sq.mtr</b>



### Performance of Students:-

#### Achievements at Intercollegiate Level

Year	No of Teams Played	No of Students Played	Events
2011-12	21	178	Football , Badminton, Table Tennis ,Chess, Basket Ball, Volley Ball, Hand Ball, Cricket, Kabbadi, Fencing, Hockey, Handball, Boxing, Archery, Swimming, Athletics, Kho –Kho, Lawn-Tennis, Judo, Rifle, Pistol Shooting, Taekwondo.
2012-13	17	195	
2013-14	25	216	
2014-15	29	228	
2015-16	32	240	
2016-17	30	261	
2017-18	30	253	
2018-19	29	260	
2019-20	39	315	

#### Achievements at Inter Group Level

Year	No. of Students Selected	Participation in Events
2011-12	50	Football , Badminton, Table Tennis ,Chess, Basket Ball, Volley Ball Cricket, Kabbadi, Weight Lifting, Fencing
2012-13	68	Football , Badminton, Table Tennis ,Chess, Basket Ball, Volley Ball Cricket, Kabbadi, Weight Lifting, Fencing
2013-14	67	Football , Badminton, Table Tennis ,Chess, Basket Ball, Volley Ball, Cricket, Kabbadi, Fencing, Hockey, Handball, Boxing, Archery, Swimming, Athletics, Kho –Kho.
2014-15	69	Football , Badminton, Table Tennis ,Chess, Basket Ball, Volley Ball, Cricket, Kabbadi, Fencing, Hockey, Handball, Boxing, Archery, Swimming, Athletics, Kho –Kho.
2015-16	86	Football , Badminton, Table Tennis ,Chess, Basket Ball, Volley Ball, Cricket, Kabbadi, Fencing, Hockey, Handball, Boxing, Archery, Swimming, Athletics, Kho –Kho, Lawn-Tennis, Judo, Rifle, Pistol Shooting, Taekwondo.

2016-17	107	Football , Badminton, Table Tennis ,Chess, Basket Ball, Volley Ball, Cricket, Kabbadi, Fencing, Hockey, Handball, Boxing, Archery, Swimming, Kho –Kho, Lawn-Tennis, Rifle Shooting, Pistol Shooting, Taekwondo, Body Building (Best Physic), Soft Ball.
2017-18	94	Football , Badminton, Table Tennis ,Chess, Basket Ball, Volley Ball, Hand Ball, Cricket, Kabbadi, Fencing, Hockey, Boxing, Archery, Swimming, Kho –Kho, Rifle Shooting, Pistol Shooting, Taekwondo, Soft Ball.
2018-19	82	Football , Badminton, Table Tennis ,Chess, Basket Ball, Volley Ball, Hand Ball, Cricket, Kabbadi, Fencing, Hockey, Boxing, Archery, Swimming, Kho –Kho, Rifle Shooting, Pistol Shooting, Taekwondo, Soft Ball.
2019-20	130	Football , Badminton, Table Tennis ,Chess, Basket Ball, Volley Ball, Hand Ball, Cricket, Kabbadi, Fencing, Hockey, Boxing, Archery, Swimming, Kho –Kho, Rifle Shooting, Pistol Shooting, Taekwondo, Soft Ball.

#### **Achievements at Inter University Level**

Year	No. of students played at zonal level	No of Students Selected in university	Event
2011-12	50	12	Basket Ball, kho-kho, Fencing, Table Tennis, Badminton, Hockey,
2012-13	68	12	Chess, Basket Ball, Archery, Kho Kho, Fencing, Rifle Shooting
2013-14	67	21	Football , Table Tennis , Basket Ball, Volley Ball, Cricket, Fencing, Archery, Swimming, Kho-Kho.
2014-15	69	21+ 07=28 (07 Ashwamedh)	Football , Table Tennis , Basket Ball, Volley Ball, Fencing, Archery, Swimming, Kho-Kho, Chess
2015-16	85	15+02=17 (02 Ashwamedh)	Chess, Table Tennis, Football , Swimming, Lawn-Tennis, Kabbadi, Badminton, Handball, Basket Ball, Archery, Volley Ball, Boxing, Judo, Athletics, Kho –Kho, Cricket, Fencing, Rifle, Pistol Shooting, Taekwondo, Hockey.
2016-17	107	16+04=20 (04 Ashwamedh)	Table Tennis, Football , Lawn-Tennis, Kabbadi, Badminton, Basket Ball, Kho –Kho, Cricket, Fencing, Rifle & Pistol Shooting, Hockey, Soft



			Ball, Body Building (Best Physic).
2017-18	94	13+03=16 (03 Ashwamedh)	Chess, Football, Volley Ball, Basket Ball, Kho – Kho, Cricket, Fencing, Taekwondo, Hockey, Soft Ball.
2018-19	82	19+02=21	
2019-20	107	Aprox. 12	

### **Host for Intercollegiate Tournament**

Year	Event	Number of Teams Participated	
		Boys	Girls
2011-12	Table tennis	04	02
	Hockey	05	--
2012 -13	Foot Ball	07	--
	Basket Ball	07	03
2013-14	Table Tennis	05	03
	Hockey	03	-
2014-15	Hockey	03	-
	Football	04	-
2015-16	Hockey	03	-
2016-17	Hockey	03	--
	Basket Ball	04	03
2017-18	Hockey	03	--
	Football (Inter Group).	04	--
2018-2019	Hockey	03	--
2019-2020	Foot Ball	04	03
	Hockey	03	03
	Ball Badminton	04	03
	Soft Ball (Inter Group)	04	04

### Annual Sports

Year	No. of Students participated	Participation in Events
2011-12	Boys – 486 Girls - 198	Football , Badminton, Table Tennis ,Chess, Basket Ball, Volley Ball Cricket, Kabbadi, Weight Lifting, Fencing' cross country
2012-13	Boys – 608 Girls - 226	Football , Badminton, Table Tennis ,Chess, Basket Ball, Volley Ball Cricket, Kabbadi, Weight Lifting, Fencing , cross country
2013-14	Boys- 618 Girls-230	Football , Badminton, Table Tennis ,Chess, Basket Ball, Volley Ball Cricket, Kabbadi, Weight Lifting, Fencing , cross country.
2014-15	Boys-621 Girls-228	Football , Badminton, Table Tennis ,Chess, Basket Ball, Volley Ball Cricket, Kabbadi, Weight Lifting, Fencing , cross country.
2015-16	Boys-569 Girls-221	Badminton, Table Tennis, Chess, Basket Ball, Volley Ball Cricket, Kabbadi, Hand Ball, Archery, Snookar, 100mtr. Running.
2016-17	Boys-576 Girls-234	Badminton, Table Tennis, Chess, Basket Ball, Volley Ball Cricket, Kabbadi, Hand Ball, Archery, Snookar, 100mtr. Running.
2017-18	Boys - 463 Girls - 193	Badminton, Table Tennis, Chess, Basket Ball, Volley Ball Cricket, Kabbadi, Hand Ball, Archery, Snookar, 100mtr. Running.
2018-19	Boys -470 Girls -198	Badminton, Table Tennis, Chess, Basket Ball, Volley Ball Cricket, Kabbadi, Hand Ball, Archery, Snookar, 100mtr. Running.
2019-20	Boys -520 Girls -210	Badminton, Table Tennis, Chess, Basket Ball, Volley Ball Cricket, Kabbadi, Hand Ball, Archery, Snookar, 100mtr. Running.



**SSBT's College of Engineering and Technology, Bambhori, Jalgaon**  
**CULTURAL COMMITTEE (2019-20)**  
**Activities during Academic Year 2019-20 Sem-1**

Year 2019-20 (Term 1) Cultural Activities				
Sr.No	Date	Events	Venue	Participants
1	3/08/19 - 22/08/19	Induction Programe	Pharmacy building	First year
2	15/08/2018	Independence Day	Lawn	800 students,200 staff
3	24/08/2019	Dahi Handi	GROUND	500 STUDENTS
4	28/08/2019	Safety Awareness	A/C SEMINAR HALL	200 students
5	28/08/2019	Seminar by Sakal and Gilet company	A/C SEMINAR HALL	200 STUDENTS
6	02/09/2018	Ganesh Utsav	Near shree ganesh mandir	Staff and students
7	07/09/2019	My Campus star by 94.3 MY FM	Non a/c SEMINAR HALL	80 students
8	15/09/2019	Engineer day	Ac seminar hall	200 students



### **Soft Skill Development Facilities**

The soft skill development facilities are provided at the college level through training and placement cell which is headed by Training and Placement Officer. Faculty members of each department are the member of the cell. They are provided with computer tools such as scanner, Internet etc.

The College has signed MOU with AON Consulting Private Limited, New Delhi, online assessment platform for verbal, technical and aptitude test for success in professional & personal life also the college is inducing Soft Skills, Technical Skills, Interpersonal Skills by arranging Short Term Training programs regularly for students.

The college is the member of the federation of the engineering colleges under Kavayitri Bahinabai Chaudhari North Maharashtra University, Jalgaon and the soft skills facilities are also provided at the federation level. The Training and Placement Cell caters to soft skill development in the following areas:

- a) Work ethic
- b) Courtesy
- c) Teamwork
- d) Self-discipline and self confidence
- e) Conformity to prevailing norms pertaining to dress, body language, tone of voice and vocabulary according to the particular culture of the given work place
- f) Language Proficiency and environmental awareness



Prepared on 10.01.20

**APPENDIX - 1**

**LAND**

**Enclose with appendix 01, 7/12 extracts or other documents showing ownership of land on which the buildings are constructed.**

**Particulars of ownership of land of Engineering college only do not club with polytechnic or otherst**

Sr.No	Date of Purchase or Acquisition	Gut No.or Survey No	Area in Hacters	Present ownership title
01	The Collector, Jalgaon vide letter No.3-RR4431, dated 17/10/1984	280	8.75	Shram Sadhana Sadhana Bombay Trust
02	The Collector, Jalgaon vide letter No.3-RR4431, dated 17/10/1984	290	0.44	Shram Sadhana Sadhana Bombay Trust
	<b>Total Area</b>		9.19	

# SSBT'S COLLEGE OF ENGINEERING & TECH. BAMBHORI, JALGAON.

Department: - 1) **Civil Engineering**

Building wise/Department wise space allocation

Sr. No.	Particulars/Details	Room No.	Size Maximum m x m	Carpet Area in Sq m.	Remarks
1	Departmental Office	102	4.5 x 6	27	Administrative
2	HOD Cabin	102A	4.5 x 6	27	Administrative
3	Staff Cabin	G16A,13B 104A, 108B 105(A) 105(B) G20 (B) 102 A 314	2x3x4 2x3x4 4.5 x 4.5 6 x 3 3 x 3 7.5x3 6x3	24 24 20 18 09 22 18	Administrative 180
4	Class Room Class Room Class Room Class Room Class Room Class Room Tutorial UG Tutorial UG	203 205 212 305 114 321 G13A G10A	12 x 9 15 x9 12x9 12x9 12x9 12x9 4.5 x 7.5 6x5.65	108 135 108 108 108 108 34 34	Instructional 473
5					Instructional
	Seminar Hall	G14	18x9	162	
6	Laboratories				UG 388
	1) Engg. Geology Lab	108	10.5 x 9	95	Instructional
	2) TOM I Lab Concrete	G9 + G10	12 x 9-6x5.5	74	UG
	3) TOM II lab	G10	9x9	81	
	4) Engineering Mechanic I	109	9 x 9	81	PG
	5) Engg. Mechanics II	110	9 x 9	81	12 labs 1101
	6) Geotechnical Lab	G13	18 x 9+9 x 3-3x3-4.5x7.5	147	
	7) Survey Lab	108 (A)	7.5x9	68	
	8) Fluid Mechanics I	G19	12 x 9-3x4	96	
	9) Fluid Mechanics II	G20	9x9+3x3	90	
	10) Comp lab UG & PG	101	12 x 9	108	
	11) Environmental Lab/ Research Lab	103+104	12 x 9-3x3	99	PG Shared UG
	12) Transportation Lab	105	9 x9	81	
	13) Dept. Library	102C	3x7.5	23	UG
7	Store	G 20 (A)	3 x 3	09	Administrative
8	Toilet	G11+G12 106+107 206+207	3 x 6 3 x 6 3 x 6	18 18 18	Amenities 54
9	Passage,  Passage GF, FF, SF Stair	G8 205 212	1.5 x 5.5 6 x 1.5 6 x 1.5 3x51x3 3x 3x4.5	8.25 09 09 459 40.5	Circulation & Other 525
	Total			2803	

Total Instructional area =2029

Total Administrative area = 198

Total Amenities area= 54



**SSBT'S COLLEGE OF ENGINEERING & TECH. BAMBHORI, JALGAON.**

 Department: - 2) **Computer Engineering**

Building wise/Department wise space allocation

Sr. No.	Particulars/Details	Room No.	Size Maxim m x m	Carpet Area in Sq m.	Remarks
1	Departmental Office	G22A	6 x 3	18	Administrative
2	HOD Cabin (Computer)	G22 (B)	(6 x6)+ 1.5x3	40	Administrative
3	Staff Cabin	B2 G22C G22D G22F G25A G28 G30A 115A2 115B2 115C2 115D1 115D2 129 G31 B1A B3A	6X3 3.2X3.2 3.2X3.2 3.2X3.2 3X4.5 3.0X4.5 3X7.5 3.2X3.2 3.2X3.2 3.2X3.2 3.2X3.2 3.2X3.2 6X3 6X3 3X3 3X3	18 10 10 10 13 13 22 10 10 10 10 10 18 18 09 09	Administrative 258
4	Class Room Class Room Class Room Class Room Class Room Tutorial Room U G Tutorial Room U G Tutorial Room P G	303 309 316 320 115 310 315 115A1	12 x 9 12 x 9 12 x 9 12 x 9 12 x 9 6X9 6X9 6 x 5.5	108 108 108 108 108 54 54 33	Instructional 681  UG UG PG
5	Seminar Hall	317	18 x 9	162	Instructional
6	Laboratories				Instructional
	1) Lab 1/ Data Structure Lab	B2A	15 x 6	90	UG
	2) Lab 2/Embedded System Lab	B1	9 x 7.5	68	UG
	3) Lab 3/M.E.(CSE) Computer Lab	115A	12x9-3x3-6X5.5	66	PG
	4) Lab 4/ Digital & Microprocessor Lab	B3	9 x 9	81	UG
	5) Lab 5/Software Engg. Lab	G25 C	9 x 7.5	68	UG
	6) Lab 6/Programming Lab-I	G25B	9 x 9-3 x 4.5	67	UG
	7)Lab 7/Database Lab	G28 C	9 x 7.5	67	UG
	8)Lab 8/System Programming Lab	G28A	7.5 x 9	67	UG
	9)Lab 9/Project Lab	G29	9 x 9	81	UG
	10) Lab 10/ Linux Lab	115D	18x9-6x3	144	UG
	11) Lab 11/Programming Lab-II	115C	9 x9-3X3.	71	UG
	12) Lab12 /M.E. (CSE ) Research Lab	115B	9 x9-3X3.	71	PG
	13) Departmental Library	G30	6 x 3	18	
7	Pantry Toilet	G22E G26,G27 318,19	3.2x3.2 3 x 6 3x6	10 18 18	Amenities

Passage,	B2(C)	3 x 3	09	Circulation
	B1	12 x 3	36	&
		3 x 3	09	Other
	G28	9 x 1.5	13.5	387
	G25	9 x 1.5	13.5	
Store	B2 (D)	3 x 3	09	Administration
Server Room	G25 (A)	3 x 3	09	Administration
UPS Room	B4A	3 x 3	09	Administration
UPS Room1	B5	9x3	27	
Passage GF	GF	50x3	150	
Passage Basement	SF	21x3	66	
Stair GF , Basement		12x3	36	
		2x3x4.5	27	

Total Instructional area = 1802

Total Administrative area = 258

Total Amenities area= 46

### SSBT'S COLLEGE OF ENGINEERING & TECH. BAMBHORI, JALGAON.

Department: - 3) **Biotech**

Building wise / Department wise space allocation

Sr. No.	Particulars/Details	Room No.	Size Maximum m x m	Carpet Area in Sq m.	Remarks
1	Departmental Office	236A	6 x 3	18	Administrative
2	HOD Cabin	234	6 x 3+6x2	30	Administrative
3	Staff Cabin	237A	6x3	18	98  UD
		238A	3x4	12	
		239 A	3x4	12	
		227 <sup>a</sup>	2.7x3	8	
4	Class Room	224	6x9	54	Instructional 222
		225	6x7.5	45	
		B12	9x6	54	
	Tutorial room	226	4x9	36	
	Tutorial room	111A	5.5x6	33	
5	Seminar Hall with chemical	308	18 x 9	162	Instructional
6	Laboratories				Instructional
	1) Microbiology Lab	238	9 x 9-3x4	69	UG 913
	2) Biochemistry Lab	239	9 x 9-3x4	69	
	3) Bio process Engg.	242	4.8 x 9+ 3x7.5	66	
	4) Fermentation	241	9 x 7.3	66	
	5) Bioprocess model & simulation Lab	244	4.8 x 9+ 3x7.5	66	
	6) Plant tissue culture	245	9 x 7.3	66	UD
	7) Project lab	235	9x9-2x6	69	UD
	8) Immunology MBGE	236	9X9-6X2	69	UD
	9) Research lab	227	6.2x9+3.5x3	66	UD
	10) Bioinformatics Lab	111	12x5.5	66	
7	Toilet	240	3 x 3	09	Amenities
	Passage SF		66x3	198	Circulation
	Stair		1x3x4.5	13.5	212
	Total				

Total Instructional area = 1056

Total Administrative area = 98

Total Amenities area= 09



**SSBT'S COLLEGE OF ENGINEERING & TECH. BAMBHORI, JALGAON.**

Department: -4) **Mechanical Engineering**

Building wise/Department wise space allocation

Sr. No.	Particulars/Details	Room No.	Size Maximum m x m	Carpet Area in Sq m.	Remarks
1	<b>Departmental Office</b>	M108	7.5 x 7.6	57	Administrative
2	HOD Cabin	M107	7.5 x 3.6	27	Administrative
3	Staff Cabin	M 2,3,6,7 M109 M110,111 M201 M202 M207 M208  M209 M214	4x3.7x3.7 3.4x3.7 2x3x3.7 3.75x3.5 3X3.5 4.5x3.75 5.75x3.5  3.5x1 4.5x3.75 2.5x3.75	56 13 22 13 10.5 17 20  3.5 17 9	Administrative 295
4	MESA Office	M310	7.5x4	30	Administrative
5	Class Room <b>SE (B)</b> <b>TE (A)</b> <b>TE (B)</b> <b>BE (A)</b> <b>BE (B)</b> <b>SE (A)</b> Tutorial Room <b>P G*</b>	M301 M302 M303 M304 M306 M309 M102 A	7.5x11 7.5x11.3 7.5x11.3 7.5x11.3 9.5x11.3 9.5 x 11.3 7.5 x4.5	82 85 85 85 107 107 34 P G	Instructional 658     Cr 551 PG
6	Drawing Hall	M305	9.7x7.5	73	Instructional
7	Seminar Hall	M104	7.5x18.75	141	214
8	Laboratories				Instructional
	1)Heat Transfer Lab	M001	7.5 x18.75	141	UG PG 1298
	2) Heat Power Lab	M004	7.5 x18.75	141	UG
	3) RAC lab	M007	7.5x11.30	85	PG
	4) Lab	M007A	7.5x7.45 +2.25x7.5	73	
	5) Computer Lab	M102	7.5x14.5	109	
	6) Research Lab	M103	7.5x18.75	141	Research Institute lab
	7) Tribology Lab	M204	9.5x11.3	107	PG
	8) Materials Science Lab	M203	9.5x11.2+ 7.5x1	114	
	9) Mechanical Measurement & Metrology Lab	M205	9.5x11.3	107	
	10) Mechatronics Lab	M213	9.5x11.3	107	
	11) Theory of Machine	M210	9.5xx11.3	107	
	12) Model & project Lab	M206	9.5x11.3+ 7.5x1	114	
	13) Automobile lab	M005	10.5x18.75	196	
	14) Dept library	M101	7.5x7.25	54	
9	Toilet	M105,106, 211,212 307,308	6x3.8x3.8	87	Amenities 87
10	Passage, Passage FF,SF& TF Passage FF & TF Passage SF Stair	GF	2.75x20 3x12.75 x3.75 3x42x2.75 3x4x10.5	55 143 346 126	Circulation & Other 670

Total Instructional area = 2395

Total Administrative area = 295

Total Amenities area=87

**SSBT'S COLLEGE OF ENGINEERING & TECH. BAMBHORI, JALGAON.**

Department: - 5) **Chemical Engineering**

Building wise/Department wise space allocation

Sr. No.	Particulars/Details	Room No.	Size Maximum m x m	Carpet Area in Sq m.	Remarks
1	Departmental Office	139	6 x 4.5	27	Administrative
2	HOD Cabin	139 (A)	6 x 3	18	Administrative
3	Staff Cabin	G42 (A)	3 x 3	09	Administrative 126
		G42 (B)	3 x 6	18	
		134	3 x 6	18	
		138A	3 x 6	18	
		140 A	3x6	18	
4	Class Room	122	6 x 9	54	Instructional 189
		123	6 x 9	54	
		124	6x7.5	45	
	Tutorial Room	125	4x9	36	
5	Seminar Hall with Biotech	308	18 x 9	162*	Instructional
6	Laboratories				820
	1) Mass transfer I	G42A	7.5 x 9	68	Instructional
	2) M T II	G42B	7.5 x 9	68	
	3) U. O. I	G44 A	4.8x9+3x7.5	66	
	4) U O II	G 44 B	9x7.3	66	
	5) Instrumentation lab	G 45 A	4.8x9+3x7.5	66	
	6) Process Control	G 45 B	9x7.3	66	
	7) C. R. E. Lab	138	12 x 9-3x6	90	
	8) C. T. Lab	140	12 x 9-3x6	90	
	9) Computer Lab	136	9 x 9	81	
	10) Project Lab	135	9 x 9	81	
	11) <b>Research Lab</b>	126	8x9	72	
	Compressor room		2x3	6	
8	Toilet	137	3 x 3	09	Amenities 18
		G43	3 x 3	09	
9	Passage GF,FF		2x54x3	324	Circulation & Other 406
	Passage GF,FF		2 x 6x3	36	
	Stair GF'FF'		3x3x4.5	40.5	
	<b>Total</b>				

Total Instructional area = **1009**

Total Administrative area = **126**

Total Amenities area = **18**



**SSBT'S COLLEGE OF ENGINEERING & TECH. BAMBHORI, JALGAON.**

Department: - 6) **Electrical Engineering**

Building wise / Department wise space allocation

Sr. No.	Particulars/Details	Room No.	Size Maximum m x m	Carpet Area in Sq m.	Remarks
1	HOD Cabin	E110	7.60x3.8	29	Administrative
	Staff Cabins	E002B E006A E007A,B E105A E111 E112	3.8x3.8 3.8x 3.8 2x3x3.8 3x3.8 3.8x2.8 3.8x3.8	14 14 22 11 11 14	115
2	Class Room Class Room* Class Room* <b>Tutorial UG</b> <b>Tutorial PG</b> <b>Seminar Room</b>	E104 E107 E108 E002A E102 A310	6x11.4 7.3x11.4 7.3x11.4 4.4x7.7 5.5 x7.5 9.10x17	68 83 83 33 40 155	Instructional 462
3	Laboratories				Instructional
	1) Measurement Lab1	E002	10.8x7.6 - 3.8x3.8	68	UG+PG 904
	2) Control System lab2	E003	10.8x7.6	82	UG 728
	3) Electrical Machine Lab I Lab 3	E004	15.2 x 4.5 + 3.8 x 1.8	75	PG 184
	4) Machine lab II / PSS	E005	7.6 x 10.7	81	
	5) Power System lab	E006	7.6x10.7 - 3.8x3.8	67	
	6) Switch Gear Lab SGP	E007	7.6 x9	68	
	7) <b>P G Lab</b>	E001	7.6 x9	68	
	8) High voltage lab	E008	7.6 x 8.7	68	
	9) Research lab PG	E 101	6x11.4	68	
	10) Electronic Lab	E105	7.6x9.0	68	
	11) Control System	E106	9 x 7.6	68	
	12) Computer Lab	E109	7.30 x 11.4	83	
	13) Library	E 003A	7.6X4.4+ 1.8x3.8	40	
5	Toilets	E102	3.65x7.30	27	Amenities 13
6	Circulation Paved passage	stair GF	2x12 3 x 46 3 x 23	24 138 69	231
	<b>Total</b>			<b>1786</b>	

Total Instructional area = **1366**

Total Administrative area = **115**

Total Amenities area=**13**

# SSBT'S COLLEGE OF ENGINEERING & TECH. BAMBHORI, JALGAON.

Department: - 7) **Electronics & Telecommunication Engineering**

Building wise/Department wise space allocation

Sr. No.	Particulars/Details	Room No.	Size Max. m x m	Carpet Area in Sq m.	Remarks
1	Departmental Office	202A	4.5x6	27	Administrative
2	HOD Cabin	202	4.5 x 6	27	Administrative
3	Staff Cabin	119A 121B 202B,C 209A B 210 211 213ABC 214 215A 216 A 217A1 217B1 201B	3.2x3.2 2.4x2.4 2x3 x 7.5 2x3.2x3.2 3 x 3 3 x 3 3 x 2.5x2.5 6 x 3 3.2 x 3.2 3.2x3.2 2.8x2.8 3.2x3.2 3.2x3.2	10 6 45 20 9 9 18 18 10 10 8 10 10	Administrative  237
4	Class Room  Tutorial Room U G Tutorial Room P G	301 302 312 313 322 325 220A 221 A	12 x 9 12 x 9 12 x 9 12 x 9 12X9 12x9 9 x 3.8 9X 3.8	108 108 108 108 108 108 34 UG 34 PG	Instructional  716
5	Seminar Hall	208	18x9	162	Instructional
6	Laboratories 1) Computer lab 2) EM / EI Lab 3) NAS / FOC Lab 4) Communication Lab 5) RMT Lab 6)TV & CE Lab 7) E D / TM Lab 8)Basic electronics &project Lab 9) EE E/P E Lab 10) Comp lab PG 11) Research lab PG 12) Library	119  201 213 215 216 217(B) 217(A) 220 221 209 A 209 B 201(A)	9 x 9  9 x 9-3.2x3.2 12x9-3x9 9 x 9-3.2x3.2 9 x 9-3.2x3.2 9 x 9-3.2x3.2 9.3 x8-2.8x2.8 9 x 7.5 12 x 9 -9X3.8 9x9-3.2x3.2 9 x 7.5 3 x 7.5	81  71 81 71 71 71 67 68 75 67 71 22	Instructional  PG      11 lab 816 * PG PG
7	Toilet	117+118 218+219	3 x 6 3 x 6	18 18	Amenities 36
	Passage Passage GF, FF, SF Passage FF, SF Passage SF Stair Stair	201	3 x 1.5 3x12x3 2x27x3 18x3 3x4.5x4.5 3x3x4.5	4.5 108 162 54 60.75 40.5	Circulation 430
	Total			2416	

Total Instructional area = **1694**

Total Administrative area = **237**

Total Amenities area=**36**



**SSBT'S COLLEGE OF ENGINEERING & TECH. BAMBHORI, JALGAON.**

 Department: - 8) **Information Technology**

Building wise/Department wise space allocation

Sr. No.	Particulars/Details	Room No.	Size Maximum m x m	Carpet Area in Sq m.	Remarks
1	HOD Cabin	E210	3.65x5 3.80x1.80	25	Administrative
2	Departmental Office	E209	3.5x7.3	26	Administrative
3	Staff Cabins Staff Cabins	E211-213 E 203 A E 204 A E 205 A	3x3x3.65 4x3 7.6 x 3.8 3.4 x 3.5	33 12 20 12	Administrative 128
4	Class Rooms  Tutorial Room Tutorial Room	E 305 E 311 E 312 E308A E310A	10.80x7.60 11.40x7.60 11.40x7.60 7.8x5.2 7.8x5.2	82 87 87 40 40	Instructional 336  UD
5	Seminar Hall	310	18.30x7.60	139	139
6	Laboratories				Instructional
	1)Programming lab / lab3	E 201	9.50 x 7.60	72	753
	2) Digital & micro processor / lab 1	E202	9.50 x 7.60	72	
	3) Computer Network / lab 6	E203	11.4 x 7.60	86	
	4) Data base & management / lab 7*	E204	7.60 x 9	68	
	5) Lab 8	E205	9.10 x 9.30	84	
	6) Operating System / lab 5	E 206	7.30 x9.50	69	
	7) Data Structure / lab2	E 207	7.30 x 9.20	67	
	8) Multimedia / lab 4	E 208	7.30 x 9.20	67	
	9)Lab 9 undeveloped	E303	7.60 x 10.80 - 3.5x3.8	69	
	10)Lab 10 undeveloped	E304	7.60 x 8.80	67	
	11) Dept. Library	E205B	9.1x3.5	32	
7	Toilet		2x7.65x3.8	58	Amenities 58
8	Passage SF      Stair	SF SF SF TF	11.5x1.80 30.5x1.8 46x2 7.5x2 2x7.5x3.75 41x1.8 3.65x9 2x9.5x3.8 2x6.2x1.9	21 55 92 15 56 74 33 +11 72 24	Circulation 453

 Total Instructional area = **1228**

 Total Administrative area = **128**

 Total Amenities area= **58**

**SSBT'S COLLEGE OF ENGINEERING & TECH. BAMBHORI, JALGAON.**Department: - 9) **MBA**

Building wise/Department wise space allocation

Sr. No.	Particulars/Details	Room No.	Size Maximum m x m	Area Sq m.	Remarks
1	HOD Cabin	A209	3.00x6.65	20	Administrative
	Department Office/ Lib.	A208	6.00x 6.65	20+20=40	Administrative
2	Staff Cabin	A203	3.0x4.00	12	Administrative 111
		A204A	3x3.0x3.0	27	
		A212	3x4	12	
3	Class Room	A202	9.1x7.4	67	Instructional 436
	Class Room	A213	9.1x7.4	67	
4	Seminar Hall*	A211	7.9x17.0	134	Instructional
5	Computer Lab	A204	7.3x14.0	102	Instructional
	Tutorial room I	A206	4.5x7.4	33	
	Tutorial room II	A207	4.5x7.4	33	
6	Toilets	A203,12A	2x1.2x1.8	4	
		A205,10	2x2.9x3.3	19	
7	Passage	FF	19.5x2.4	47	Circulation 158
		SF	19.5x2.4	47	
	Stair		3x3.2x6.7	64	
	Total				

Total Instructional area = **436**Total Administrative area = **111**

Total Amenities area= 23



**SSBT'S COLLEGE OF ENGINEERING & TECH. BAMBHORI, JALGAON.**Department: - 11) **Applied Science**

Building wise/Department wise space allocation

Sr. No.	Particulars/Details	Room No.	Size Maximum m x m	Carpet Area in Sq m.	Remarks
1	HOD Cabin	G41	3 x 6	18	Administrative
	Dept office	G40A,B	3x9	27	
2	Staff Cabin	B14(A) B15 G 34A,B G35 A,B G37A,B G38 G39A,B 320A	3 x 6 3x3 3x7.5 3x7.5 3x9 3 x6 3x9 3x7.5	18 9 22 22 27 18 27 22 – 165	Administrative 210
3	Class Room	130 131 132 133 229 230 232 233	9 x 9 9 x 9 9 x 9 9 x 9 9 x 9 9 x 9 9 x 9 9 x 9	81 81 81 81 81 81 81 81	Instructional 999  CR 8 648
4	Drawing Hall/ class Room	G37	15x9	135	
5	Laboratories				Instructional
	1) Physics Lab	B14	15 x 9+3 x 3	144	Lab 4-522
	2) Chemistry Lab	G 40	15 x 9	135	
	3) Environment lab	G 34	12 x 9	108	NR
	4) Language & audio visual lab	G 39	15 x 9	135	NR Furniture
6	Toilet	228 306	2x3 x 3 2x3x6	18 18	Amenities
	Passage		54x3	162	Circulation
	Stair		3x4.5	13.5	& other 175
	Total				

Total Instructional area =1170

Total Administrative area = 210

Total Amenities area= 36

## **Teaching Learning Process**

### **Methodology**

For effective teaching learning process good and adequate infrastructure facilities are available. The class rooms and labs / workshop are well lighted with natural light during day time with circulation of fresh air. Conventional methods is adopted where in black board, chalk and faculty are involved in teaching the students in conjunction with modern methods like charts, cut models, OHPS, LCD's , electronics media like e-books , educational CD's, VCD. TV's are adopted by the faculty . Course files for all the subject are available in each department. Each department is having a departmental library and computer lab connected with internet. The central library is computerized with Del Net facilities and has AC reference room in addition to a reading room and staff rooms.

A computer center having 40 terminals is independently available for the use of faculty and students. The computer center is provided with internet facility and is available both during working hours and in additional time also.

### **Effectiveness**

To asses the effectiveness of learning process by the students, two class tests at each month end and an assignment week is conducted where in the students are given an assignment sheets in a period sometime during 5<sup>th</sup> and 6<sup>th</sup> week of the term as per notified schedule and the students who gets the maximum marks is given a book on subject as reward with intention of motivating him for better performance in forthcoming university examination. The answer papers are checked in time and are shown to students and are collected back for record duly signed by student concerned.

Internal continuous evaluation system is followed for evaluation of term work as per guidelines issued by the University.

### **Motivations and rewards**

Gold medals are awarded by the Management who are University first position rank holder in branch of Chemical Engg., Production Engg., Computer Engg. and Electronics Engg. in the University convocation. The University toppers are also felicitated at the college level in the afternoon of University convocation day.



**Shrama Sadhana Bombay Trust's**  
**COLLEGE OF ENGINEERING & TECHNOLOGY, BAMBHORI, JALGAON**  
**TENTATIVE ACADEMIC CALENDAR (TERM-I) 2019-20**

Sr.No.	Activity	Day	Date / From -To
1.	Opening of College for Students & their registration (S.E. to B.E.& ME - II)	Monday	01 July 2019
2.	Commencement of Classes (S.E. to B.E.)	Tuesday	02 July 2019
3.	Opening of College & Enrollment for Induction Programme for F.E. Students	Thursday	01 Aug. 2019
4.	Commencement of Classes (DSE and M.E.-I year)	Thursday	01 Aug. 2019
5.	Start of Induction Programme for F.E. Students	Thursday to Wednesday	01 to 21 Aug. 2019
6.	S.E., T.E. & B.E. : ISE-I	Tuesday Wednesday Friday	13 Aug. 2019 14 Aug. 2019 16 Aug. 2019
7.	Independence Day Celebration	Thursday	15 Aug. 2019
8.	Add-on Course	Monday to Wednesday	19 to 21 Aug. 2019
9.	Display of ISE – I (S.E. to B.E.) Results	Thursday	22 Aug. 2019
10.	Feedback from Students (SE to BE)	Friday to Saturday	23 to 24 Aug. 2019
11.	Commencement of FE classes	Monday	26 Aug. 2019
12.	Seminar & Project Presentation (T.E. & B.E.) ( Starting Date)	Monday	26 Aug. 2019
13.	Meeting of IQAC	Saturday	07 Sept. 2019
14.	Alumni Meet	Sunday	15 Sept. 2019
15.	Engineer's Day	Sunday	15 Sept. 2019
16.	F.E. : ISE-I S.E., T.E. & B.E. : ISE-II	Saturday Monday Tuesday	21 Sept. 2019 23 Sept. 2019 24 Sept. 2019
17.	Display of ISE – I (F.E.) Results Display of ISE – II (S.E. to B.E.) Results	Saturday	28 Sept. 2019
18.	Seminar & Project Presentation (T.E. & B.E.) (Date of Completion)	Saturday	05 Oct. 2019
19.	Makeup Week (S.E. to B.E.)	Monday to Saturday	7 to 12 Oct 2019
20.	ISE Backlog	Thursday to Saturday	10 to 12 Oct. 2019
21.	S.E. To B.E. : ICA	Monday to Tuesday	14 to 15 Oct. 2019
22.	F.E. & DSE: ISE-II S.E., T.E. & B.E. : ISE - III	Friday Saturday Monday	18 Oct. 2019 19 Oct. 2019 21 Oct. 2019
23.	F.E. and M.E. - I: ICA	Tuesday to Wednesday	22 to 23 Oct. 2019
24.	End of Term	Wednesday	23 Oct. 2019
25.	Display of ISE – II ( F.E and DSE ) Results	Wednesday	30 Oct. 2019
26.	PR/OR Exam. (F.E to B.E.& M.E. - I) (Tentatively)	Thursday to Saturday	31 Oct. to 09 Nov. 2019
27.	University Theory Examination (Tentatively)	Monday to Tuesday	11 Nov. to 10 Dec. 2019
28.	International Conference on Global Trends in Science, Technology, Humanities, Commerce& Management	Saturday to Monday	28 Dec. to 30 Dec. 2019

**Shrama Sadhana Bombay Trust's  
COLLEGE OF ENGINEERING & TECHNOLOGY, BAMBHORI, JALGAON.  
TENTATIVE ACADEMIC CALENDAR (TERM-II) 2019 – 20**

Sr. No.	Activity	Day	Date / From -To
1.	Start of II Term: Registration of students (F.E. to B.E. and M.E. – I)	Monday	06Jan. 2020
2.	Commencement of Classes (F.E. to B.E. and M.E. – I)	Tuesday	07 Jan. 2020
3.	FEAST (Festival of Engineers, Administrators, Scientists, and Technocrats)	Thursday to Saturday	9, 10, 11 Jan. 2020
4.	Republic Day Celebration	Sunday	26 Jan.2020
5.	F.E. to B.E. : ISE-I	Tuesday, Thursday, Saturday	18, 20, 22Feb. 2020
6.	Cultural Activities and Annual Gathering (VasantUtsav)	Monday to Saturday	24 to 29 Feb. 2020
7.	Annual Sports	Tuesday to Thursday	25 to 27 Feb. 2020
8.	Science Exhibition for FE (By Applied Science Dept.)	Friday	28 Feb.2020
9.	Parents Meet	Sunday	01Mar. 2020
10.	Display of ISE – I (F.E. to B.E.) Results	Monday	02Mar. 2020
11.	Add-on Course	Monday to Wednesday	02 to 04 Mar. 2020
12.	Feedback from Students	Thursday to Friday	05 to 06 Mar. 2020
13.	Student Level Technical Paper Presentation (Milestone 2K20)	Saturday	07 Mar. 2020
14.	Entrepreneurship Awareness Camp. for T.E. &B.E. Students	Saturday & Sunday	07, 08 Mar. 2020
15.	Women's day	Sunday	08 Mar. 2020
16.	Project Presentation (T.E.& B.E.) (Till Date)	Saturday	21 Mar. 2020
17.	F.E. to B.E.: ISE-II	Friday, Saturday, Monday	27, 28, 30 Mar.2020
18.	Makeup Week (F.E. to B.E.)	Tuesday to Tuesday	31 Mar. to 7 Apr. 2020
19.	ISE Backlog	Friday, Saturday, Tuesday	03, 04, 07 April 2020
20.	Display of ISE – II (F.E. to B.E.) Results	Saturday	04 Apr. 2020
21.	Shodh PrakalpaPratiyogita 2020 (Project Demo - B.E.)	Saturday	04Apr. 2020
22.	F.E. to B.E. and M.E. – I: ICA	Wednesday to Thursday	08 to 09 Apr.2020
23.	ISE – III	Saturday, Sunday, Monday	11, 12, 13 April 2020
24.	End of Term	Monday	13 Apr. 2020
25.	PR/Oral Exam., FE to BE & ME – I (Tentatively)	Wednesday to Saturday	15 to 25 Apr. 2020
26.	Theory Exam., FE to BE & ME (Tentatively)	Friday to Monday	2 to 31 May 2020
27.	Internship (S.E. & T.E.)	Monday to Tuesday	01 to 30 Jun. 2020
28.	Project Oral (BE) (Tentatively)	Tuesday to Friday	02 to 05 June 2020
29.	Commencement of Next Academic Year	Wednesday	01 July. 2020

(Dr. K.S.Wani)  
Principal

Copy to:

- 1) Chairman, G.B. &C.D.C.
- 2) All H.O.Ds,3) DOAD, 4) DOA, 5) Director, R&D, 6) Director, Technical Development,7) TPO,8)D.R.9) A.R. 10) O.S.,11) Exam. Office, 12) Chairman, Alumni Meet, 13) Store, 14) Library, 15) Chairman, Cultural Activities 16) Physical Director 17) Admission Office, 18) PRO & Coordinator- Parents Meet, 19) Student Welfare Officer, 20) Rector (Boys Hostel), 21) Rector (Girls Hostel), 22) Coordinator, ISTE & IE (I), 23) Vehicle Incharge, 24) Principal office

**NORTH MAHARASHTRA UNIVERSITY,**

**JALGAON (M.S.)**

**First Year Engineering**

**(Common for All)**

**Faculty of Science and Technology**



**'A' Grade  
NAAC Re-Accredited  
(3<sup>rd</sup> Cycle)**

**SYLLABUS STRUCTURE**

**Semester – I & II**

**W.E.F. 2018 – 19**

## Subject Group Code and Subject Groups

Sr. No.	GROUP	Category	Breakup of Credits (Total 160)
1	A	Humanities and Social Sciences including Management Courses (HSMC)	10
2	B	Basic Science Courses (BSC)	26
3	C	Engineering Science Courses including workshop, drawing, basics of electrical/mechanical/computer etc. (ESC)	26
4	D	Professional Core Courses (PCC)	53
5	E	Professional Elective Courses relevant to chosen specialization/branch (PEC)	18
6	F	Open subjects – Electives from other technical and /or emerging subjects (OEC)	12
7	G	Project work, seminar and internship in industry or appropriate work place/ academic and research institutions in India/abroad (PROJ)	15
8	H	Mandatory Courses (MC) [Environmental Sciences, Induction program, Indian Constitution, Essence of Indian Traditional Knowledge]	
<b>Total</b>			<b>160</b>

**Syllabus Structure for First Year Engineering (Semester – I) (Computer, IT, Electrical, E & TC, Instrumentation) (w.e.f. 2018 – 19)**  
**(As per AICTE Guidelines)**

(As per AICTE Guidelines)	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Physics	B	3	1	-	4	40	60	-	-	100	4
Mathematics - I	B	3	1	-	4	40	60	-	-	100	4
Basic Electrical & Electronics Engineering	C	3	1	-	4	40	60	-	-	100	4
Programming for Problem Solving	C	3	-	-	3	40	60	-	-	100	3
Physics Lab	B	-	-	2	2	-	-	25	-	25	1
Basic Electrical & Electronics Engineering Lab	C	-	-	2	2	-	-	25	25 (OR)	50	1
Programming for Problem Solving Lab	C	-	-	2	2	-	-	25	25 (PR)	50	1
Induction Program*	H	-	-	-	-	-	-	-	-	-	-
		12	3	6	21	160	240	75	50	525	18

\* 3-week long Induction Program for students entering the institution, right at the start.

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

**Syllabus Structure for First Year Engineering (Semester – I) (Mechanical, Civil, Chemical, Biotech, Automobile) (w.e.f. 2018 – 19)**  
**(As per AICTE Guidelines)**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Chemistry	B	3	1	-	4	40	60	-	-	100	4
Mathematics –I	B	3	1		4	40	60	-	-	100	4
Engineering Graphics	C	3	-	-	3	40	60	-	-	100	3
English	A	3		-	3	40	60	-	-	100	3
Chemistry Lab	B	-	-	2	2	-	-	25	-	25	1
Engineering Graphics Lab	C	-	-	2	2	-	-	25	25 (OR)	50	1
English Lab	A	-	-	2	2	-	-	25	25 (OR)	50	1
Workshop Practices	C	1	-	2	3	-	-	25	25 (OR)	50	2
Induction Program*	H	-	-	-	-	-	-	-	-	-	-
		13	2	8	23	160	240	100	75	575	19

\* 3-week long Induction Program for students entering the institution, right at the start.

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**



**Syllabus Structure for First Year Engineering (Semester – II) (Computer, IT, Electrical, E & TC, Instrumentation) (w.e.f. 2018 – 19)**  
**(As per AICTE Guidelines)**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Chemistry	B	3	1	-	4	40	60	-	-	100	4
Mathematics – II	B	3	1		4	40	60	-	-	100	4
Engineering Graphics	C	3	-	-	3	40	60	-	-	100	3
English	A	3		-	3	40	60	-	-	100	3
Chemistry Lab	B	-	-	2	2	-	-	25	-	25	1
Engineering Graphics Lab	C	-	-	2	2	-	-	25	25 (OR)	50	1
English Lab	A	-	-	2	2	-	-	25	25 (OR)	50	1
Workshop Practices	C	1	-	2	3	-	-	25	25 (OR)	50	2
		13	2	8	23	160	240	100	75	575	19

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

**Syllabus Structure for First Year Engineering (Semester –I I) (Mechanical, Civil, Chemical, Biotech, Automobile) (w. e. f. 2018 – 19)**  
**(As per AICTE Guidelines)**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Physics	B	3	1	-	4	40	60	-	-	100	4
Mathematics - II	B	3	1	-	4	40	60	-	-	100	4
Basic Electrical & Electronics Engineering	C	3	1	-	4	40	60	-	-	100	4
Programming for Problem Solving	C	3	-	-	3	40	60	-	-	100	3
Physics Lab	B	-	-	2	2	-	-	25	-	25	1
Basic Electrical & Electronics Engineering Lab	C	-	-	2	2	-	-	25	25 (OR)	50	1
Programming for Problem Solving Lab	C	-	-	2	2	-	-	25	25 (PR)	50	1
		12	3	6	21	160	240	75	50	525	18

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

**NORTH MAHARASHTRA UNIVERSITY,  
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**COURSE OUTLINE**

**Semester – I&II**

**W.E.F. 2018 – 19**

Physics					
COURSE OUTLINE					
Course Title:	Physics		Short Title:	PHY	Course Code:
<b>Course description:</b> To impart knowledge of basic concepts in applied physics and implementation to various engineering fields also provide the methodology necessary for solving problems in the field of engineering.					
Lecture	Hours/week	No. of weeks	Total hours	Semester credits	
	03	14	42	04	
Tutorial	01	14	14		
<b>Prerequisite course(s):</b>					
11 <sup>th</sup> and 12 <sup>th</sup> Physics					
<b>Course objectives:</b>					
(i) To acquire the knowledge of Electromagnetic field theory that allows the student to have a solid theoretical foundation to be able in the future to design emission , propagation and reception of electro- magnetic wave systems.					
(ii) Gain an understanding of the basic principles and the experimental basis of the various fields of physics and the logical relationships of the various fields.					
(iii) To develop in the student awareness of situations in engineering, which need ideas of quantum mechanics.					
(iv) To enable the student with those aspects of quantum mechanics, which are necessary to begin to work in small structures such as those common in nanotechnology.					
(v) Students will understand semiconductor materials and devices for optoelectronics in this course.					
<b>Course outcomes:</b>					
After successful completion of this course students will be familiar with					
1. To study Bragg’s Law and introduced to the principles of lasers, types of lasers and applications					
2. Various terms related to properties of materials such as, permeability, polarization, etc.					
3. Some of the basic laws related to quantum mechanics as well as magnetic and dielectric					
4. properties of materials					
5. Simple quantum mechanics calculations					
6. Nanotechnology and their industrial applications.					
COURSE CONTENT					
Physics		Semester:		I or II	
Teaching Scheme:		Examination scheme			
Lectures:	3 hours/week		End semester exam (ESE):		60 marks
			Duration of ESE:		03 hours
			Internal Sessional Exams (ISE):		40 marks
Unit–I:		No. of Lectures: 08 Hours		Marks: 12	
<b>Introduction to Electromagnetic Theory and Optics</b>					
Electrostatics, Calculation of electric field and electrostatic potential for a charge distribution; Divergence and curl of electrostatic field; Laplace’s and Poisson’s equations for electrostatic potential and uniqueness of their solution, Bio-Savart law, Divergence and curl of static magnetic field, Magnetization and associated bound currents; magnetic susceptibility and ferromagnetic, paramagnetic and diamagnetic materials; Faraday’s law in terms of EMF produced by changing magnetic flux; Lenz’s law; Maxwell’s equation in vacuum and non-conducting medium; Electrodynamics motion of a charged particle in electric and magnetic fields. Optics: Interference , Diffraction, Polarization, Applications: CRO					
Unit–II:		No. of Lectures: 08 Hours		Marks: 12	

<b>Acoustics and Introduction to Mechanics:</b>		
Architectural acoustics and Ultrasonic. Potential energy function, $F = -\text{Grad } V$ , equipotential surfaces and meaning of gradient; Conservative and non-conservative forces, curl of a force field, Problem of central force field, Keplers laws, Inertial and non Inertial frame of references, Motion of rigid body in 2D		
<b>Unit–III:</b>	<b>No. of Lectures: 08 Hours</b>	<b>Marks: 12</b>
<b>Quantum Mechanics and Nanotechnology for Engineers</b>		
Introduction to Quantum mechanics, Wave nature of Particles, Time-dependent and time independent Schrodinger equation for wave function, Solution of stationary-state Schrodinger equation for one dimensional problems– particle in a box. wave function, Born interpretation, probability current, Expectation values, Free-particle wave function and wave-packets, Uncertainty principle.		
Nanotechnology: Synthesis, Characterization and applications of nanoscience and nanotechnology		
<b>Unit–IV:</b>	<b>No. of Lectures: 08 Hours</b>	<b>Marks: 12</b>
<b>Atomic Molecular physics</b>		
Inner-shell vacancy, X-rays and Auger transitions, Compton effect. Properties of laser beams: monochromaticity, coherence, directionality and brightness, laser speckles, absorption, spontaneous emission, and stimulated emission; Einstein’s theory of matter radiation interaction and A and B coefficients; applications of lasers in science, engineering and medicine)., types of lasers gas lasers ( He-Ne,Co <sub>2</sub> ); Application: Fiber optics		
<b>Unit–V:</b>	<b>No. of Lectures: 08 Hours</b>	<b>Marks: 12</b>
<b>Solid state physics and Semiconductor Physics</b>		
Energy bands in solids, metals, semiconductors, and insulators; Intrinsic and extrinsic Semiconductors; p-n junction, Photovoltaic effect.		
Superconductivity (Superconductivity-basic phenomenology, Meissner effect, Type I and Type II superconductors, BCS pairing mechanisms, High T <sub>c</sub> materials.) Applications Hall effect, Solid state laser (Ruby, Nd: YAG ).		
<b>Text Books:</b>		
<ol style="list-style-type: none"> <li>1. David Griffiths, Introduction to Electrodynamics, 4<sup>th</sup> edition, Pearson Publication</li> <li>2. Eisberg and Resnick, Quantum Physics of Atoms, Molecules, Solids, Nuclei and Particles 2<sup>nd</sup> Edition, Wiley Publication</li> <li>3. Gupta , Kumar and Saxena, “Solid State Physics ”Pragati Publication</li> <li>4. N Zettili, “Quantum Physics” 2<sup>th</sup> edition, Wiley Publication</li> <li>5. Gupta ,Kumar and Sharma, Atomic and Molecular Physics, Pragati Prakashan</li> <li>6. Murthy, “Textbook Of Nanosciene And Nanotechnology”, University Press</li> <li>7. J. C. Upadhyya, “Classical Mechanics” Himalaya Publication House.</li> </ol>		
<b>Reference Books:</b>		
<ol style="list-style-type: none"> <li>1. Resnick , Halliday, Krane, “Physics, Volume I and II” Wiley Publication, 5<sup>th</sup> Edition</li> <li>2. W. Saslow, Electricity, Magnetism and light,Academic Press Publication</li> <li>3. O. Svelto, Principles of Lasers, Springer Publication.</li> <li>4. Quila “ Perspective of Quantum Mechanics”, NCBA Publication</li> <li>5. M A Wahab ,Solid State Physics, Narosa Publishing House,</li> </ol>		

MATHEMATICS-I					
COURSE OUTLINE					
Course Title:	Mathematics –I		Short Title:	M-I	Course Code:
<b>Course description:</b> This course is aimed at introducing the fundamentals of basic Mathematics to undergraduate students. The background expected includes a prior knowledge of Mathematics from 12th science and familiarity with various laws, principles and theories. The goals of the course are to understand the basic principle of Mathematics and its application in different area.					
Lecture	Hours/week	No. of weeks	Total hours	Semester credits	
	3	14	42	4	
Tutorial	1	14	14		
<b>Prerequisite course(s):</b> 11 <sup>th</sup> & 12 <sup>th</sup> mathematics					
Course objectives:					
The objective of this course is to familiarize the prospective engineers with techniques in calculus, multivariate analysis and linear algebra. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their discipline					
<b>Course outcomes:</b>					
After successful completion of this course the student will be able to:					
<div>1. Apply differential and integral calculus. Apart from some other applications they will have a basic understanding of Beta and Gamma functions.</div> <div>2. The fallouts of Rolle’s Theorem that is fundamental to application of analysis to Engineering problems.</div> <div>3. The tool of Fourier series for learning advanced Engineering Mathematics.</div> <div>4. To deal with functions of several variables that are essential in most branches of Engineering.The essential tool of matrices and linear algebra in a comprehensive manner.</div>					
COURSE CONTENT					
Mathematics -I		Semester:		I	
Teaching Scheme:		Examination scheme			
Lectures:	3 hours/week	End semester exam (ESE):		60 marks	
Tutorial	1 hours/week	Duration of ESE:		03 hours	
		Internal Sessional Exams (ISE):		40 marks	
Unit–I:		No. of Lectures: 08 Hours		Marks: 12	
Matrices:					
Introduction to rank of a matrix; System of linear equations; Symmetric and orthogonal matrices; Eigen values and Eigenvectors, Diagonalization of matrices. Application of matrices (Rotation )					
Unit–II:		No. of Lectures: 08 Hours		Marks: 12	
Differential and Integral Calculus:					
Rolle’s Theorem, Mean value theorem, Taylor’s and Maclaurin’s theorem; Gamma function, Beta function					
Unit–III:		No. of Lectures: 08 Hours		Marks: 12	
Partial Differentiation:					
Partial derivatives, Eulers theorem, Composite function, total derivative; Method of Lagranges multipliers.					
Unit–IV:		No. of Lectures: 08 Hours		Marks: 12	
A) Fourier series					
Full range Fourier series, Half range sine and cosine series.					

<b>B)Vector Calculus :</b> Gradient ,Curl, Divergence, Directional Derivatives.		
<b>Unit-V:</b>	<b>No. of Lectures: 08 Hours</b>	<b>Marks: 12</b>
<b>Complex Number:</b>		
Circular functions, Hyperbolic and Inverse Hyperbolic functions, logarithms of complex number, resolving real and imaginary parts of a complex number.		
<b>Text Books:</b>		
<ol style="list-style-type: none"> <li>1. H.K.DASS “Advance Engineering Mathematics” S. Chand publications.</li> <li>2. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications,Reprint, 2010,2016.</li> <li>3. DebashisDatta “Textbook of Engineering Mathematics” New Age International Publication. Revised second edition.</li> <li>4. “Engineering Mathematics A Tutorial Approach”. Ravish R..Singh, Mukul Bhatt.Tata McGraw Hill Education Private Limited .New Delhi.</li> </ol>		
<b>Reference Book:</b>		
<ol style="list-style-type: none"> <li>1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.</li> <li>2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley &amp; Sons,2006.</li> <li>3. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi,2008.</li> <li>4. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.</li> <li>5. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005..</li> <li>6. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010</li> </ol>		

Basic Electrical and Electronics Engineering					
COURSE OUTLINE					
Course Title:	Basic Electrical and Electronics Engineering		Short Title:	BEEE	Course Code:
Course description:					
This course provides an introduction to electrical and electronics engineering which includes over view of electric power generation, single and three phase AC circuit, fundamentals of electrical installation, semiconductor devices such as diodes, transistor, FETs and Power Electronic devices, logic gates and their application.					
	Hours/week	No. of weeks	Total hours	Semester credits	
Lecture	03	14	42	04	
Tutorial	01	14	14		
Prerequisite course(s):					
11 <sup>th</sup> & 12 <sup>th</sup> Physics					
Course objectives:					
1. To explain basic laws and theorems of electrical networks 2. To explain fundamentals alternating current circuits. 3. To provide students with a firm grasp of the essential principles of basic electronics. 4. To understand the concepts and terminology that is used in electronics engineering. 5. It is not an in-depth Electronic course but, rather a course aimed at acquiring an understanding of basic principles that are used in electronic engineering.					
Course outcomes:					
After successful completion of this course the student will be able to:					
1. Students will be able to demonstrate knowledge of circuit analysis using various basic laws and theorems of electrical circuits 2. Students will be able to demonstrate and understand definition and relationship of various AC circuits. 3. Understand working principle of PN junction diode, Zener diode and their applications. 4. Describe different configuration of Bipolar Junction Transistor. 5. Describe different configurations of FET 6. Understand operating principle Power Electronics Devices 7. Describe use of the Basic gate and Universal gate					
COURSE CONTENT					
Basic Electrical and Electronics Engineering		Semester:		I or II	
Teaching Scheme:		Examination scheme			
Lectures:	3 hours/week	End semester exam (ESE):		60 marks	
Tutorial	1 hours/week	Duration of ESE:		03 hours	
		Internal Sessional Exams (ISE):		40 marks	
Unit–I:		No. of Lectures: 08 Hours		Marks: 12	
DC Circuit: Kirchhoff’s laws,series and parallel circuit, current and voltage division rule, Delta-star and star-delta conversion, Node voltage and Mesh current methods, Superposition theorem, Thevenin’s theorem, Norton Theorems, Maximum power transfer theorem.					
Unit–II:		No. of Lectures: 08 Hours		Marks: 12	



<b>AC Circuits:</b>		
Single phase AC Circuits: Concept of single phase supply, Terms related with A.C. quantities, pure resistive, inductive and capacitive circuits, complex and phasor representation of AC quantities. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, combinations (series and parallel), Three phase AC Circuits: Concept of Three phase supply, star and delta connections, line and phase values, solution of balanced three phase circuits, phasor diagram.		
<b>Unit–III:</b>	<b>No. of Lectures: 08 Hours</b>	<b>Marks</b>
Semiconductor Basics, Diode Equivalent Circuits, Diode Characteristics, Diode as a Switch, Diode as a Rectifier (half wave & full wave), capacitor filter, Comparison of rectifiers, Breakdown Mechanisms, Zener Diode – Operation, characteristics and Application, Photo diode, LED. Bipolar Junction Transistor (BJT): Common Base, Common Emitter and Common Collector Configurations, their dc current gains, regions of operations, Operating Point, Load line, Voltage Divider Bias Configuration, BJT amplifier.		
<b>Unit–IV:</b>	<b>No. of Lectures: 08 Hours</b>	<b>Marks: 12</b>
Field Effect Transistor (FET): Construction, Characteristics and working of Junction FET, JFET Parameters, JFET as switch. Depletion and Enhancement type MOSFET: Construction, Characteristics and working, Comparison of MOSFET with JFET and BJT. Introduction to NMOS, PMOS & CMOS circuits, CMOS as Switch.		
<b>Unit–V:</b>	<b>No. of Lectures: 08 Hours</b>	<b>Marks: 12</b>
Silicon Controlled Rectifier (SCR): Operation, Construction, Characteristics, Applications. Triac & UJT ( Working, Characteristics and applications) Number System & their Conversions, De-Morgan's theorem, Boolean Algebra Truth Tables and Functionality of Logic Gates – NOT, OR, AND, NOR, NAND, XOR and XNOR. Electric Wiring installations: Types of insulated wires & wiring systems, concept of fuses, MCBs, RCCB, ELCBs, etc. in wiring installations, concept of earthing, energy bill calculations.		
<b>Text Books:</b>		
<ol style="list-style-type: none"> <li>1. B. L. Theraja and A. K. Theraja, "A Text book of Electrical Technology - Vol-I and Vol-II", S. Chand, 1<sup>st</sup> Edition, 2001.</li> <li>2. K. A. Krishnamurthy, M. R. Raghuveer, "Electrical and Electronics Engineering for Scientists and Engineers," Wiley Eastern Limited.</li> <li>3. J. B. Gupta, "A Course in Electrical Power", S. K. Kataria and Sons, 12<sup>th</sup> Edition, 2002.</li> <li>4. R. S. Sedha, "Applied Electronics", S. Chand Publication</li> <li>5. V.K. Mehta, "Principles of Electronics", S. Chand Publications</li> </ol>		
<b>Reference Books:</b>		
<ol style="list-style-type: none"> <li>1. V. N. Mittal, Arvind Mittal, "Basic Electrical Engineering", Tata McGraw Hill publishing co. ltd, New Delhi.</li> <li>2. D. P. Kothari, I.J Nagrath, "Basic Electrical Engineering", Tata McGraw Hill</li> <li>3. M. S. Naidu, S. Kamakshaiah, "Introduction to Electrical Engineering", Tata McGraw Hill.</li> <li>4. P. Tiwari, "Basic Electrical Engineering", New Age Publication.</li> <li>5. Vincent Del Toro, "Electrical Engineering Fundamentals", Pearson</li> <li>6. R. P. Jain, "Modern Digital Electronics" McGraw Hill Education (India) Private Limited, Fourth Edition, 2017.</li> <li>7. B. L. Theraja, "Applied Electronics" S. Chand Publication</li> <li>8. A.P. Malvino, "Electronics Principles" TMH Publications.</li> </ol>		

Programming for Problem Solving					
COURSE OUTLINE					
Course Title:	Programming for Problem Solving		Short Title:	PPS	Course Code:
Course description:					
This course provides students with a comprehensive study of the C programming language. This course focuses on introduction to program design and problem solving using the C programming language. Programming topics include control structures, functions, arrays, pointers, and file I/O.					
Lecture	Hours/week	No. of weeks	Total hours	Semester credits	
	03	14	42	04	
Prerequisite course(s):					
Physics					
Course objectives:					
To impart knowledge so that the student will:					
1. Learn the fundamentals, structure and syntax of C Language.					
2. Write simple programs in C Language.					
Course outcomes:					
After successful completion of this course the student will be able to:					
1. To formulate simple algorithms for arithmetic and logical problems					
2. Understand the fundamentals of C programming.					
3. To test and execute the programs and correct syntax and logical errors					
4. Choose the loops and decision making statements to solve the problem.					
5. To decompose a problem into functions and synthesize a complete program using divide and conquer approach					
6. To use arrays, pointers and structures to formulate algorithms and programs					
COURSE CONTENT					
Programming for Problem Solving		Semester:		I or II	
Teaching Scheme:		Examination scheme			
Lectures:	3 hours/week	End semester exam (ESE):		60 marks	
		Duration of ESE:		03 hours	
		Internal Sessional Exams (ISE):		40 marks	
Unit–I:		No. of Lectures: 08 Hours		Marks: 12	
Introduction					
What is C, The C Character set, Constant, Variables & Keywords, Types of C Constants, Rules for constructing Integer Constants, Rules for constructing Real Constants, Rules for constructing Character Constants, Types of C Variables, Rules for constructing Variable Names, Comments in a C Program					
Type Declaration Instruction, Type Conversion in Assignments					
Data Types Revisited: Integers, long & short, signed & unsigned, Chars, signed & unsigned, Float & Doubles					
Console Input/Output: Types of I/O, Console I/O Function, Formatted Console I/O Functions, Unformatted Console I/O Functions					
Decision Control Instruction: The if statement, Multiple Statements within if, The if-else statement, Nested if-else, Forms of if					
Use of Logical Operators, The else if Clause, The   Operator, The Conditional Operators					
Unit–II:		No. of Lectures: 08 Hours		Marks: 12	
Loop					
Loop Control Instruction: Loops, the while Loop, Tips & Traps, More Operators, for Loop, Nesting of Loops, Multiple Initialization in the for Loop, the break Statement, the continue Statement, The do-while Loop, The Odd Loop					

Case Control Instruction: Decisions using switch, The Tips & Traps, switch versus if-else Ladder, The go to Keyword		
<b>Unit–III:</b>	<b>No. of Lectures: 08 Hours</b>	<b>Marks: 12</b>
<b>Function &amp; Pointers</b>		
Function: What is a Function? Why use Functions? Passing Values between Functions, Scope Rule of Functions, Order of Passing Arguments, Using Library Functions Pointers: Call by Value and Call by Reference, An Introduction to Pointers, Pointer Notation, Back to Function Calls		
<b>Unit–IV:</b>	<b>No. of Lectures: 08 Hours</b>	<b>Marks: 12</b>
<b>Array</b>		
Arrays: What are Arrays? A Simple Program using Array, more on Arrays, Array Initialization, Array Elements in Memory, Bounds Checking, Passing Array Elements to a Function, Pointers and Arrays, Passing an Entire Array to a Function Multidimensional Array: Two Dimensional Arrays, initializing a Two-Dimensional Array, Memory Map of a Two-Dimensional Array, Pointers and Two Dimensional Arrays, Pointer to an Array, Passing 2 D Array to a Function, Array of Pointers, Three-Dimensional Array		
<b>Unit–V:</b>	<b>No. of Lectures: 08 Hours</b>	<b>Marks: 12</b>
<b>Strings &amp; Structure</b>		
Strings: What are Strings? More about Strings, Pointers and Strings, Standard Library String Functions: strlen(), strcpy(), strcat(), strcmp() Handling Multiple Strings: Two-Dimensional Array of Characters, Array of Pointers to strings, Limitations of Array of Pointers to Strings Structures: Why use Structures? Declaring a Structure, Accessing Structure Elements, How Structure Elements are Stored? Array of Structure		
<b>Text Books:</b>		
1. Yashavant Kanetkar, Let Us C, BPB Publication, 14 <sup>th</sup> Edition		
<b>Reference Books:</b>		
1. E Balagurusamy, Programming in ANSIC C by, Tata McGraw Hill, 4 <sup>th</sup> Edition 2. K. R. Venugopal and S. R. Prasad, Mastering C, Tata McGraw Hill, 2011, 2 <sup>nd</sup> Edition 3. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, PHI, 2 <sup>nd</sup> Edition 4. Paul Deitel and Harvey Deitel, C How to Program, Pearson, 8 <sup>th</sup> Edition 5. R.S. Salaria, Computer concepts and Programming in C, Khanna Publication		



Chemistry					
COURSE OUTLINE					
Course Title:	Chemistry		Short Title:	CHY	Course Code:
Course description:					
This course is aimed at introducing the fundamentals of basic sciences (Chemistry) to undergraduate students. The background expected includes a prior knowledge of chemistry from HSC (science) and familiarity with basic fundamental theories. The goals of the course are to understand the basic principles of Chemistry and their applications in different branches of engineering.					
Lecture	Hours/week	No. of weeks	Total hours	Semester credits	
	03	14	42	04	
Tutorial	01	14	14		
Prerequisite course(s):					
11 <sup>th</sup> & 12 <sup>th</sup> Chemistry					
Course objectives:					
To apply the knowledge of science in engineering and technology and also understand the basic concepts of chemistry and to analyze it from experiments.					
Course outcomes:					
After successful completion of this course the student will be able to:					
The concepts developed in this course will aid in quantification of several concepts in Chemistry that have been introduced at the 10+2 levels in schools. Technology is being Increasingly based on the electronic, atomic and molecular level modifications. Quantum theory is more than 100 years old and to understand phenomena at nanometer levels, one has to base the description of all chemical processes at molecular levels. The course will enable the student to:					
<div>1. Analyse microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces.</div> <div>2. Rationalise bulk properties and processes using thermodynamic considerations.</div> <div>3. Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques</div> <div>4. Rationalise periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity.</div> <div>5. List major chemical reactions that are used in the synthesis of molecules.</div>					
COURSE CONTENT					
Chemistry		Semester:		I or II	
Teaching Scheme:		Examination scheme			
Lectures:	2 hours/week	End semester exam (ESE):		60 marks	
Tutorial	1 hours/week	Duration of ESE:		03 hours	
		Internal Sessional Exams (ISE):		40 marks	
Unit–I:		No. of Lectures: 08 Hours		Marks: 12	
Atomic and molecular structure					
Schrodinger equations, Schrodinger equation. Particle in a box solutions and their applications for conjugated molecules and nanoparticles, Molecular orbitals of diatomic molecules and plots of the multicentre orbitals. Equations for atomic and molecular orbitals. Energy level diagrams of diatomics. Pi-molecular orbitals of butadiene and benzene and aromaticity. Crystal field theory and the energy level diagrams for transition metal ions and their magnetic properties. Band structure of solids and the role of doping on band structures.					
Unit–II:		No. of Lectures: 08 Hours		Marks: 12	
Spectroscopic techniques and applications					

Principles of spectroscopy and selection rules. Electronic spectroscopy. Fluorescence and its applications in medicine. Vibrational and rotational spectroscopy of diatomic molecules. Applications of Nuclear magnetic resonance and magnetic resonance imaging, Diffraction and scattering.		
<b>Unit-III:</b>	<b>No. of Lectures: 08 Hours</b>	<b>Marks: 12</b>
<b>Periodic properties</b> Effective nuclear charge, penetration of orbitals, variations of s, p, d and f orbital energies of atoms in the periodic table, electronic configurations, atomic and ionic sizes, ionization energies, electron affinity and electronegativity, polarizability, oxidation states, coordination numbers and geometries, hard soft acids and bases,		
<b>Unit-IV:</b>	<b>No. of Lectures: 08 Hours</b>	<b>Marks: 12</b>
<b>Intermolecular forces and potential energy surfaces.</b> Ionic, dipolar and van Der Waals interactions. Equations of state of real gases and critical Phenomenon . Potential energy surfaces of H <sub>3</sub> , H <sub>2</sub> F and HCN. <b>Use of free energy in chemical equilibria</b> Thermodynamic functions: definitions - energy, entropy and free energy. Estimations of entropy and free energies. Free energy and e.m.f. Cell potentials, the Nernst equation and applications.		
<b>Unit-V:</b>	<b>No. of Lectures: 08 Hours</b>	<b>Marks: 12</b>
<b>Stereochemistry.</b> Isomerism, structural isomers and stereoisomers, configurations and symmetry and chirality, enantiomers, diastereomers, optical activity, absolute configurations ( R and S Configuration with Ex.) and conformational analysis.(Staggered and eclipsed Conformation of Ethane) <b>Organic reactions and synthesis of a drug molecule</b> Introduction to reactions involving substitution, addition, elimination, oxidation, reduction, Synthesis of a commonly used drug molecule.( Aspirin and Paracetamol)		
<b>Text Books</b>		
1.Tembe, Kamaluddin and Krishnan,,Engineering Chemistry, (NPTEL Web-book)		
<b>Reference Books:</b>		
1. B. H. Mahan University chemistry, Pearsons Publication, 4 <sup>th</sup> edition 2. M. J. Sienko and R. A. Plane, Chemistry: Principles and Applications, 3. C. N. Banwell, Fundamentals of Molecular Spectroscopy,Mcgraw Higher Ed., 4 <sup>th</sup> edition. 4. P. W. Atkins, Physical Chemistry, Oxford University Press, 7 <sup>th</sup> edition. 5. J. D. Lee Concise Inorganic Chemistry ,Oxford University Press, 5 th edition 6. Puri,Sharma, Kalia, Principles of Inorganic Chemistry		

ENGINEERING GRAPHICS					
COURSE OUTLINE					
Course Title:	ENGINEERING GRAPHICS		Short Title:	EG	Course Code:
Course description:					
Engineering Graphics is the language of engineers. The concepts of Engineering Graphics are used to develop, express the ideas, and convey the instructions which are used to carry out jobs in the field Engineering. The course illustrates the techniques of graphics in actual practice. This preliminary course aims at building a foundation for the further course in drawing and other allied subjects. This subject is useful in developing drafting and sketching skills of students.					
Lecture	Hours/week	No. of weeks	Total hours	Semester credits	
	03	14	42	03	
Prerequisite course (s):					
Course objectives:					
This course objectives are - 1. To design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability 2. To communicate effectively 3. To use the techniques, skills, and modern engineering tools necessary for engineering practice					
Course outcomes:					
All phases of manufacturing or construction require the conversion of new ideas and design concepts into the basic line language of graphics. The student will learn : 1. Introduction to engineering design and its place in society 2. Exposure to the visual aspects of engineering design 3. Exposure to engineering graphics standards 4. Exposure to solid modeling.					
COURSE CONTENT					
ENGINEERING GRAPHICS		Semester:		I or II	
Teaching Scheme:		Examination scheme			
Lectures:	3 hours/week	End semester exam (ESE):		60 marks	
		Duration of ESE:		04 hours	
		Internal Sessional Exams (ISE):		40 marks	
Unit–I:		No. of Lectures: 08 Hours		Marks: 12	
Introduction To Engineering Graphics:- A) Principles of Engineering Graphics and their significance, usage of Drawing Instruments and Supporting Material, Letters and Numbers as per BIS : SP46-2003, Scale (Plane , Diagonal & Vernier scale) B) Curves and Conic Section draw ellipse by directrix and arc of circle method. draw parabola by directrix and rectangle method . draw hyperbola by rectangle and directrix method.Cycloid, Epicycloid, Hypocycloid and Involute.					
Unit–II:		No. of Lectures: 08 Hours		Marks: 12	
A) PROJECTIONS OF STRAIGHT LINES:- Principle of Orthographic Projections,-, Projections of Points, Projection of Line, Lines inclined to both the Planes,					



<b>B) PROJECTIONS OF PLANES:-</b> Projection of different simple shapes e.g. Circle, Triangle, Rectangle, Pentagon and Hexagon on principle plane (Inclined to one plane and to both planes).		
<b>Unit–III:</b>	<b>No. of Lectures: 10 Hours</b>	<b>Marks: 12</b>
A) Projection of simple solid. Projection of Prism, Pyramid, Cone, Cylinder and Cube with their axis inclined to one reference plane and parallel to other Projection of Prism, Pyramid, Cone, Cylinder and Cube with their axis inclined to one reference plane and parallel to other B) Development of solid surfaces e.g. Prism, Cylinder, Cone, Pyramid and Cubes		
<b>Unit–IV:</b>	<b>No. of Lectures: 08 Hours</b>	<b>Marks: 12</b>
A) Orthographic projections of different machine parts problem on first angle &Third Angle. B) Types of sections and Conversion of pictorial view into sectional orthographic views		
<b>Unit–V:</b>	<b>No. of Lectures: 08 Hours</b>	<b>Marks: 12</b>
<b>ISOMETRIC PROJECTIONS</b>		
Introduction, Isometric axes, lines and planes, true scale and isometric scale. Isometric projection and Isometric view Conversion of given orthographic view into isometric projection.		
<b>Text Books:</b>		
1. Venugopal K and Prabhu Raja V(2015), “Engineering Graphics”, New AGE International Publishers,. 2. Narayana,K.L& P Kannaiah(2008),Text book on “Engineering Drawing. SciTech Publication.		
<b>Reference Books:</b>		
1. N.D. Bhat and V.M. Panchal, Engineering Graphics, Charotar Publishers 2013 2. Agrawal B &Agrawal B.C (2008) Engineering Graphics, TMH Publication.		

Workshop Practices						
COURSE OUTLINE						
Course Title:	Workshop Practices		Short Title:	WP	Course Code:	
Course description:						
This course covers the basic knowledge of different manufacturing methods like sand casting, dies casting, metal casting, forming, machining, joining, CNC machining, additive manufacturing and advanced manufacturing methods. It also covers the fundamentals of fitting operations, power tools, knowledge of electrical & electronics, carpentry tools and equipment, plastic molding, glass cutting, arc welding, gas welding and brazing.						
Lecture	Hours/week	No. of weeks	Total hours	Semester credits		
	01	14	14	02		
Practices	02	14	28			
Prerequisite course(s):						
12 <sup>th</sup> Physics, mathematics, basic knowledge of drawing						
Course objectives:						
<div>1. To study the basics of metal machining.</div> <div>2. To study the different cutting tool materials and types &amp; geometry of cutting tools.</div> <div>3. To learn introductory concepts of additive manufacturing.</div> <div>4. To understand basic manufacturing processes like casting and welding and learn various aspects of casting methods and welding methods.</div> <div>5. To know about the applications of advanced manufacturing processes.</div> <div>6. To understand basics of electrical &amp; electronics, carpentry joints, tools equipment, fitting operations, tools, equipment.</div> <div>7. To understand concepts of plastic molding and glass cutting.</div> <div>8. To get the knowledge of brazing.</div>						
Course outcomes:						
After successful completion of this course the student will be able to:						
<div>1. Students will be able to fabricate components with their own hands.</div> <div>2. Get practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes.</div> <div>3. Assemble different components, they will be able to produce small devices of their interest.</div>						
COURSE CONTENT						
Workshop Practices		Semester:		I or II		
Teaching Scheme:						
Lectures:	01 hour/week					
Unit–I: Manufacturing Methods		No. of Lectures: 04 Hours				
<div>a) Sand casting, die casting, casting defects etc. rolling, forging etc.</div> <div>b) Introduction to machining, cutting tool, cutting tool materials, different machining operation, welding, classification of welding, different welding process.</div> <div>c) Advanced Manufacturing methods- Introduction, different advanced manufacturing methods.</div> <div>d) Introduction to metal casting, patterns, pattern material, gating system, core, mold.</div>						
Unit–II: CNC machining		No. of Lectures: 01 Hour				

<b>and Additive manufacturing</b>		
Introduction to CNC, classification of CNC, advantages, disadvantages, part programming, Additive manufacturing		
<b>Unit–III: Fitting Operations &amp; Power tools</b>	<b>No. of Lectures: 03 Hour</b>	
<p>Different type of fitting operations, tools, equipment, Introduction to power tools, classification of power tools.</p> <p>Introduction to carpentry tools and equipment, types of carpentry joints.</p> <p>Introduction to plastic molding, plastic molding technique, etc. Introduction to glass cutting, use of glass cutter.</p>		
<b>Unit–IV: Electrical &amp; Electronics</b>	<b>No. of Lectures: 01 Hour</b>	
<p>Single phase, three phase, direct current, transformers, transformer losses, miniature circuit breakers, earth leakage circuit breakers, house wiring, different type of cables, extension boards, concept of maintenance, maintenance of electrical equipment, importance of grounding. Introduction of PCB, types of PCB, mounting components and soldering.</p>		
<b>Unit–V: Welding ( arc welding &amp; gas welding), Brazing</b>	<b>No. of Lectures: 01 Hour</b>	
<p>Introduction to arc welding and gas welding, types of welding joints, types of flames, etc. Introduction to brazing process, difference between brazing and welding, flux, filler material.</p>		
<b>Text Books:</b>		
<p>1. Hajrachoudhury S. K., hajraChoudhury A. K and Nirjhar Roy “Elements of Workshop Technology” Vol.1 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai.</p>		
<b>Reference Books:</b>		
<p>1. Kalpakjian S. and Steven S. Schmid, “Manufacturing Engineering and Technology” 4th edition, Perason Education India Edition, 2002.</p> <p>2. Gowri P. hariharan and A. Suresh Babu, “ Manufacturing Technology – I” Perason education, 2008</p> <p>3. Roy A. Lindberg, “Processes and Materials of manufacture”, 4th Edition, Prentice hall India,1998.</p>		



English					
COURSE OUTLINE					
Course Title:	English		Short Title:	ENG	Course Code:
Course description:					
This course has been designed paying special attention to the contemporary industrial needs and current society demands for Communicative Language skills.					
Lecture	Hours/week	No. of weeks	Total hours	Semester credits	
	03	14	42	3	
Prerequisite course(s):					
11th& 12th English					
Course objectives:					
1. To acquire basic proficiency in English including reading and listening					
2. To demonstrate proficiency in the use of written English, including proper spelling, Grammar and punctuation.					
3. Toenhancetheir ability to use spoken words in interpersonal communication, small group interactions and public speaking					
Comprehension, writing and speaking skills.					
4. Becomeaccomplishedtechnicalcommunicators.					
Course outcomes:					
After successful completion of this course the student will be able to:					
1. To acquire basic proficiency in English including reading and listening					
2. To demonstrate proficiency in the use of written English, including proper spelling, Grammar and punctuation.					
3. To enhance their ability to use spoken words in interpersonal communication, small group interactions and public speaking					
Comprehension, writing and speaking skills.					
4. Become accomplished technical communicators.					
COURSE CONTENT					
English		Semester:		I or II	
Teaching Scheme:		Examination scheme			
Lectures:	03 hours/week		End semester exam (ESE):		60 marks
			Duration of ESE:		03 hours
			Internal Sessional Exams (ISE):		40 marks
Unit–I:		No. of Lectures: 08 Hours		Marks: 12	
1. Introduction to Phonetics					
1.1 Vowel Sounds					
1.2 Consonant Sounds					
1.3 Diphthongs					
1.4 Intonation					
Unit–II:		No. of Lectures: 08 Hours		Marks: 12	
2. Basic Writing Skills					
2.1 Sentence Structures					
2.2 Use of phrases and clauses in sentences					
2.3 Importance of proper punctuation					
2.4 Creating coherence					
2.5 Organizing principles of paragraphs in documents					
2.6 Techniques for writing precisely					

<b>Unit–III:</b>	<b>No. of Lectures: 08 Hours</b>	<b>Marks: 12</b>
<b>3. Identifying Common Errors in Writing</b> 3.1 Subject-verb agreement 3.2 Noun-pronoun agreement 3.3 Tenses 3.4 Articles 3.5 Prepositions 3.6 Primary Auxiliary Verbs 3.7 Modal Auxiliary Verbs		
<b>Unit–IV:</b>	<b>No. of Lectures: 08 Hours</b>	<b>Marks: 12</b>
<b>4. Nature and Style of sensible Writing</b> 4.1 Describing 4.2 Defining 4.3 Classifying 4.4 Job Application 4.5 Résumé, Curriculum Vitae & Bio-Data		
<b>Unit–V:</b>	<b>No. of Lectures: 08 Hours</b>	<b>Marks: 12</b>
<b>5. Reading Comprehension</b> 5.1 Skimming 5.2 Scanning 5.3 Intensive 5.4 Extensive		
<b>Text Book</b>		
<b>1.</b> Raymond Murrphy, Essential English Grammar, Cambridge University Press, 2 <sup>nd</sup> edition <b>2.</b> Rajinder Pal & PremLata , English Grammar&Composition, Sultan chand Publication		
<b>Reference Books:</b>		
1. Michael Swan, Practical English Usage. OUP. 1995. 2. F.T. Wood. Macmillan Remedial English Grammar..2007 3. William Zinsser, On Writing Well.. Harper Resource Book. 2001 4. Hamp-Lyons and Ben Heasley, Study Writing. Liz Cambridge University Press. 2006. 5. Sanjay Kumar and PushpLata, Communication Skills, Oxford University Press. 2011. 6. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press		

Physics Lab							
LAB COURSE OUTLINE							
Course Title:	Physics(Lab)			Short Title:	PHY (Lab)	Course Code:	
<b>Course description:</b>							
To impart knowledge of basic concepts in applied physics and implementation to various engineering fields also provide the methodology necessary for solving problems in the field of engineering.							
Laboratory	Hours/week	No. of weeks	Total hours		Semester credits		
	02	14	28		1		
<b>End Semester Exam (ESE) Pattern:</b>							
<b>Prerequisite course(s):</b>							
11 <sup>th</sup> and 12 <sup>th</sup> Physics							
<b>Course objectives:</b>							
(i) To acquire the knowledge of Electromagnetic field theory that allows the student to have a solid theoretical foundation to be able in the future to design emission , propagation and reception of electro- magnetic wave systems.							
(ii) Gain an understanding of the basic principles and the experimental basis of the various fields of physics and the logical relationships of the various fields.							
(iii) To develop in the student awareness of situations in engineering, which need ideas of quantum mechanics.							
(iv) To enable the student with those aspects of quantum mechanics, which are necessary to begin to work in small structures such as those common in nanotechnology.							
(v) Students will understand semiconductor materials and devices for optoelectronics in this course.							
<b>Course outcomes:</b>							
Upon successful completion of lab Course, student will be able to:							
1. To study Bragg’s Law and introduced to the principles of lasers, types of lasers and applications							
2. Various terms related to properties of materials such as, permeability, polarization, etc.							
3. Some of the basic laws related to quantum mechanics as well as magnetic and dielectric							
4. properties of materials							
5. Simple quantum mechanics calculations							
6. Nanotechnology and their industrial applications.							
<b>LAB COURSE CONTENT</b>							
Physics (Lab)				Semester:		I or II	
Teaching Scheme:				Examination scheme			
Practical:		2 hours/week					
				Internal Continuous Assessment (ICA):			25 marks
To conduct ten practical from given following list							
<b>Introduction to Electromagnetic and Optics</b>							
• Experiments on electromagnetic induction and electromagnetic breaking;							
• LC circuit and LCR circuit;							
• Resonance phenomena in LCR circuits;							
• Magnetic field from Helmholtz coil;							
• Measurement of Lorentz force in a vacuum tube.							



- Michelsons Interferrometer
- Brewsters Law
- Varification of Law of Malus
- To study B-H curve
- Determination of e/m by Thomsons method

### **Acoustics and Introduction to Mechanics**

- Ultrasonic Detector
- Sound level meter
- Coupled oscillators;
- Resonance phenomena in mechanical oscillators.

### **Quantum Mechanics and Nanotechnology for Engineers**

- Frank-Hertz experiment;
- Photoelectric effect experiment;
- Synthesis of Graphene by Hummer's method
- Characterization of Graphene by Hummer's method
- Synthesis of nanostructures such as nanoparticles, nanofibers, nanorods by Chemical Method; Physical Method or Hybrid Method;
- Characterization of nanostructures such as nanoparticles, nanofibers, nanorods by Chemical Method; Physical Method or Hybrid Method;
- Use of Nanostructure for solar cell fabrication.
- Conducting polymers for nanotechnology applications

### **Atomic Molecular physics**

- To determine the wavelength of He-Ne laser .
- Fiber optics communication
- Diffraction and interference experiments (from ordinary light or laser pointers)

### **Solid state physics and Semiconductor Physics**

- Diode characteristics
- I-V characteristics of Solar cell
- Determination of forbidden band gap.
- Determination of wavelength of He-Ne Laser.
- Hall effect
- Four Probe method
- Crystal structure

### **Text Books:**

1. David Griffiths, Introduction to Electrodynamics, 4<sup>th</sup> edition, Pearson Publication
2. Eisberg and Resnick, Quantum Physics of Atoms, Molecules, Solids, Nuclei and Particles 2<sup>nd</sup> Edition, Wiley Publication
3. Gupta , Kumar and Saxena, "Solid State Physics" Pragati Publication
4. N Zettili, "Quantum Physics" 2<sup>th</sup> edition, Wiley Publication
5. Gupta ,Kumar and Sharma, Atomic and Molecular Physics, Pragati Prakashan
6. Murthy, "Textbook Of Nanoscience And Nanotechnology", University Press
7. J. C. Upadhyaya, "Classical Mechanics" Himalaya Publication House.

### **Reference Books:**

1. Resnick , Halliday , Krane, "Physics, Volume I and II" Wiley Publication, 5<sup>th</sup> Edition
2. W. Saslow, Electricity, Magnetism and light, Academic Press Publication
3. O. Svelto, Principles of Lasers, Springer Publication.
4. Quila " Perspective of Quantum Mechanics", NCBA Publication
5. M A Wahab ,Solid State Physics, Narosa Publishing House,

<b>Guide lines for ICA:</b>
Students must submit ICA in the form of journal. Each assignment should be well documented. Faculty in charge will assess the assignments continuously and grade or mark each assignment on completion date declared for each assignments.
<b>Guidelines for ESE:</b>
ESE will be based on the laboratory assignments submitted by the students in the form of journal.

Basic Electrical and Electronics Engineering Lab.					
LAB COURSE OUTLINE					
Course Title:	Basic Electrical and Electronics Engineering (Lab)		Short Title:	BEEE (Lab)	Course Code:
Course description:					
Also in this laboratory course emphasis is on the understanding of the characteristics of basic circuits that use resistors, capacitors, ac/dc circuits, diodes, bipolar junction transistors, logic gates etc. The students can use this knowledge to analyze more complex circuits such as complex electrical networks, rectifiers, amplifiers, digital circuits etc. The students can use this knowledge to analyze more complex circuits such as electrical networks, single and three phase circuits etc.					
Laboratory	Hours/week	No. of weeks	Total hours	Semester credits	
	02	14	28	01	
End Semester Exam (ESE) Pattern:		Oral (OR)			
Prerequisite course(s):					
11 <sup>th</sup> & 12 <sup>th</sup> Physics					
Course objectives:					
1. The objective of this lab. is to impart the fundamental knowledge of electrical and electronics engineering to the students and to develop the students’ ability to apply the specific procedures to analyze the electrical engineering Systems.					
2. In this lab, students will be familiar with use of different theorems to analyze electrical networks. Students will also become familiar with R, L and C circuit, power measurement, etc.					
3. In this lab, students will become familiar with various basic analogue and digital electronic circuits.					
Course outcomes:					
Upon successful completion of lab Course, student will be able to:					
1. Identify electrical and electronics components/equipments.					
2. Simplify D.C. network using Superposition Theorem.					
3. Simplify D.C. network using Thevenin’s Theorem.					
4. Learn diode V-I Characteristic					
5. Understand BJT as a switch					
6. Understand LED, JFET, SCR V-I characteristics					
LAB COURSE CONTENT					
Basic Electrical and Electronics Engineering ( Lab)		Semester:		I or II	
Teaching Scheme:		Examination scheme			
Practical:	2 hours/week	End semester exam (ESE):		25 marks	
		Internal Continuous Assessment (ICA):		25 marks	

(Minimum FOUR practicals in each group)

**Group A**

1. Study and representation of electrical and electronics components/equipments.
2. Verification of Thevenin's theorems.
3. Verification of Superposition theorems.
4. Verification of Maximum power transfer theorems.
5. Measurement of current, voltage and power in R-L series excited by single phase AC supply.
6. Measurement of current, voltage and power in R-C series excited by single phase AC supply.

**Group B**

7. To plot the V-I Characteristics of P-N Junction diode forward characteristic
8. Study of BJT as a Switch a) Determination of parameters in cut off region, b) Determination of parameters in saturation region.
9. To plot the V-I Characteristics of JFET. a) drain characteristic b) transfer characteristic
10. To plot the characteristics of Light Emitting Diode (LED)
11. To plot V-I characteristics of SCR a) To plot forward characteristic of SCR. b) To determine VBO, IL & IH of SCR
12. Implementation of any Boolean expression using LOGIC GATES. a) Simplification of Boolean expression, b) Implementation using Basic gates and Universal gates

**Text Books:**

1. B. L. Theraja and A. K. Theraja, "A Text book of Electrical Technology - Vol-I and Vol-II", S. Chand, 1<sup>st</sup> Edition, 2001.
2. K. A. Krishnamurty, M. R. Raghuveer, "Electrical and Electronics Engineering for Scientists and Engineers," Willey Eastern Limited.
3. J. B. Gupta, "A Course in Electrical Power", S. K. Kataria and Sons, 12th Edition, 2002.
4. R. S. Sedha, "Applied Electronics", S. Chand Publication
5. V.K. Mehta, "Principles of Electronics", S. Chand Publications

**Reference Books:**

1. V. N. Mittal, Arvind Mittal, "Basic Electrical Engineering", Tata McGraw Hill publishing co. Ltd, New Delhi
2. D. P. Kothari, I.J Nagrath, "Basic Electrical Engineering", Tata McGraw Hill
3. M. S. Naidu, S.Kamakshaiah, "Introduction to Electrical Engineering", Tata McGraw Hill.
4. P. Tiwari, "Basic Electrical Engineering", New Age Publication.
5. Vincent Del Toro, "Electrical Engineering Fundamentals", Pearson
6. R. P. Jain, "Modern Digital Electronics" McGraw Hill Education (India) Private Limited, Fourth Edition, 2017. B. L. Theraja, "Applied Electronics" S. Chand Publication
7. A.P. Malvino, "Electronics Principles" TMH Publications.

**Guide lines for ICA:**

Students must submit ICA in the form of journal. Each assignment should be well documented. Faculty in charge will assess the assignments continuously and grade or mark each assignment on completion date declared for each assignments.

**Guidelines for ESE:**

ESE will be based on the laboratory assignments submitted by the students in the form of journal.



Programming for Problem Solving Lab					
LAB COURSE OUTLINE					
Course Title:	Programming for Problem Solving (Lab)		Short Title:	PPL (Lab)	Course Code:
Course description:					
This course provides students with a comprehensive study of the C programming language with program design and problem solving. This course focuses on Programming topics include control structures, functions, arrays, pointers, and file I/O.					
Laboratory	Hours/week	No. of weeks	Total hours	Semester credits	
	02	14	28	1	
End Semester Exam (ESE) Pattern:		Oral (OR)			
Prerequisite course(s):					
11th Physics, 12th Physics					
Course objectives:					
1. Learn the fundamentals, structure and syntax of C Language.					
2. Write simple programs in C Language.					
Course outcomes:					
Upon successful completion of lab Course, student will be able to:					
1. Understand the fundamentals of C programming.					
2. Choose the loops and decision making statements to solve the problem.					
3. Use functions to solve the given problem.					
4. Implement different Operations on arrays.					
5. Understand strings and structures.					
6. Understand the usage of pointers.					
LAB COURSE CONTENT					
Programming for Problem Solving (Lab)		Semester:		I or II	
Teaching Scheme:		Examination scheme			
Practical:	2 hours/week	End semester exam (ESE):		25 marks	
		Internal Continuous Assessment (ICA):		25 marks	
GROUP - A					
Concerned faculty member will suitably frame FIVE assignments, ONE from each UNIT of the concerned theory subject, each assignment of 20 questions from unsolved exercises of Text Books as given below. The questions should be in the nature of multiple choices, TRUE / FALSE, output of a program, identify errors in a program etc. These assignments should be performed in the lab and for hands on practice.					
GROUP - B					
Concerned faculty member should suitably frame FIVE laboratory assignments from the following list.					
1. Write a C program to find area of circle, triangle, rectangle, square using switch statement.					
2. Write a C program to find the sum of a series (looping).					
3. Write a C program to accept a string and reverse it without using library functions. Display the original and reversed string. (String handling).					
4. Write a C program that uses functions to perform the following string operations using					

function and pointers: i) To insert a sub-string in to given main string from a given position.

ii) To delete n Characters from a given position in a given string.

5. Write a C program to read 'N' elements into an array and compute the sum of all the elements stored in an array using pointer. (Arrays and pointers).

6. Write a C program to read a matrix of order (M \*N) and (P \* Q) and compute the addition and multiplication of two matrices. (Passing matrix to functions).

7. Write a C program to read 'N' students information and display the information with appropriate headings, where each student information consists of roll number, Name, total marks scored etc. (Structure handling).

Note: Use of Open Source Software/Tool/Technology is recommended for laboratory assignments of concern subject.

**Text Books:**

1. Yashavant Kanetkar, Test Your C Skills , , BPB Publication ,5th Edition

2. Yashavant Kanetkar, Let Us C by , BPB Publication, 14th Edition

**Reference Books:**

1. E Balagurusamy, Programming in ANSIC C by, Tata McGraw Hill, 4<sup>th</sup> Edition

2. K. R. Venugopal and S. R. Prasad, Mastering C, Tata McGraw Hill, 2011, 2<sup>nd</sup> Edition

3. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, PHI, 2<sup>nd</sup> Edition

4. Paul Deitel and Harvey Deitel, C How to Program, Pearson, 8<sup>th</sup> Edition

5. R.S. Salaria, Computer concepts and Programming in C, Khanna Publication

**Guide lines for ICA:**

Students must submit ICA in the form of journal. Each assignment should be well documented. Faculty in charge will assess the assignments continuously and grade or mark each assignment on completion date declared for each assignments.

**Guidelines for ESE:**

ESE will be based on the laboratory assignments submitted by the students in the form of journal.

Chemistry Lab					
LAB COURSE OUTLINE					
Course Title:	Chemistry (Lab)		Short Title:	CHY (Lab)	Course Code:
Course description:					
In this laboratory, course emphasis is on the understanding of basic principles, working of pH- meter, Bomb calorimeter, Ostwald's Viscometer, various properties of lubricating oils, proximate analysis of fuels etc. The learner can use this knowledge and apply in various branches of engineering as required.					
Laboratory	Hours/week	No. of weeks	Total hours	Semester credits	
	02	14	28	1	
End Semester Exam (ESE) Pattern:					
Prerequisite course(s):					
11 <sup>th</sup> &12 <sup>th</sup> Chemistry, Different laws, basic principles and theories.					
Course objectives:					
This course is intended to provide engineering students with a background in important concepts and principles of chemistry and emphasis on those areas considered most relevant in an engineering context, and practical applications in engineering and technology. <ul style="list-style-type: none"><li>To impart knowledge of basic concepts in chemistry and implementation to various engineering fields.</li><li>To provide the knowledge and methodology necessary for solving problems in the field of engineering.</li></ul>					
Course outcomes:					
Upon successful completion of lab Course, student will be able to:					
<ul style="list-style-type: none"><li>The chemistry laboratory course will consist of experiments illustrating the principles of chemistry relevant to the study of science and engineering. The students will learn to:</li><li>Estimate rate constants of reactions from concentration of reactants/products as a function of time</li><li>Measure molecular/system properties such as surface tension, viscosity, conductance of solutions, redox potentials, chloride content of water, etc</li><li>Synthesize a small drug molecule and analyse a salt sample .</li></ul>					
LAB COURSE CONTENT					
Chemistry (Lab)		Semester:		I or II	
Teaching Scheme:		Examination scheme			
Practical:	2 hours/week				
			Internal Continuous Assessment (ICA):		25 marks
Choice of 10-12 experiments from the following:					
<ul style="list-style-type: none"><li>Determination of surface tension and viscosity</li><li>Thin layer chromatography</li><li>Ion exchange column for determination of hardness of water</li><li>Determination of chloride content of water</li><li>Colligative properties using freezing point depression</li><li>Determination of the rate constant of a reaction</li><li>Determination of cell constant and conductance of solutions</li><li>Potentiometry - determination of redox potentials and emfs</li><li>Synthesis of a polymer/drug</li><li>Saponification/acid value of an oil</li><li>Chemical analysis of a salt</li></ul>					

<ul style="list-style-type: none"> <li>• Lattice structures and packing of spheres</li> <li>• Models of potential energy surfaces</li> <li>• Chemical oscillations- Iodine clock reaction</li> <li>• Determination of the partition coefficient of a substance between two immiscible liquids</li> <li>• Adsorption of acetic acid by charcoal</li> <li>• Use of the capillary viscosimeters to demonstrate the isoelectric point as the pH of minimum viscosity for gelatin sols and/or coagulation of the white part of egg .</li> </ul>
<b>Text Books</b>
1. Tembe, Kamaluddin and Krishnan, Engineering Chemistry, (NPTEL Web-book)
<b>Reference Books:</b>
<ol style="list-style-type: none"> <li>1. B. H. Mahan University chemistry, Pearsons Publication, 4<sup>th</sup> edition</li> <li>2. M. J. Sienko and R. A. Plane, Chemistry: Principles and Applications,</li> <li>3. C. N. Banwell, Fundamentals of Molecular Spectroscopy, McGraw Higher Ed., 4<sup>th</sup> edition.</li> <li>4. P. W. Atkins, Physical Chemistry, Oxford University Press, 7<sup>th</sup> edition.</li> </ol>
<b>Guide lines for ICA:</b>
Students must submit ICA in the form of journal. Each assignment should be well documented. Faculty in charge will assess the assignments continuously and grade or mark each assignment on completion date declared for each assignments.
<b>Guidelines for ESE:</b>
ESE will be based on the laboratory assignments submitted by the students in the form of journal.



Engineering Graphics Lab					
LAB COURSE OUTLINE					
Course Title:	Engineering Graphics (Lab)		Short Title:	EG (Lab)	Course Code:
Course description:					
Engineering Graphics is the language of engineers. The concepts of Engineering Graphics are used to develop, express the ideas, and convey the instructions which are used to carry out jobs in the field Engineering. The course illustrates the techniques of graphics in actual practice. This preliminary course aims at building a foundation for the further course in drawing and other allied subjects. This subject is useful in developing drafting and sketching skills of students.					
Laboratory	Hours/week	No. of weeks	Total hours		Semester credits
	02	14	28		01
End Semester Exam (ESE) Pattern:		Oral (OR)			
Prerequisite course(s):					
Course objectives:					
This course objectives are - 1.To design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability. 2. To communicate effectively. 3. To use the techniques, skills, and modern engineering tools necessary for engineering Practice.					
Course outcomes:					
Upon successful completion of lab Course, student will be able to:					
All phases of manufacturing or construction require the conversion of new ideas and design concepts into the basic line language of graphics. The student will learn : 1. Introduction to engineering design and its place in society 2. Exposure to the visual aspects of engineering design 3. Exposure to engineering graphics standards 4. Exposure to solid modeling.					
LAB COURSE CONTENT					
Engineering Graphics Lab		Semester:		I or II	
Teaching Scheme:		Examination scheme			
Practical:	2 hours/week		End semester exam (ESE):		25 marks
			Internal Continuous Assessment (ICA):		25 marks
Sheet No. 01 Lines, Dimensioning and Scales. (04 Hrs) Sheet No. 02 Engineering curves - Three different curves are to be draw using any one method. (04 Hrs) Sheet No. 03 Projections of Lines and Planes - Two problems on projection of lines and two problems on projection of planes (04 Hrs). Sheet No. 04 Projection of solids and Development of Surfaces (Two Problems on each) - Two problems on two different solids,					

<p>a) axis of solid inclined to HP and parallel to VP and b) Axis of solid inclined to VP and parallel to HP. (04 Hrs)</p> <p><b>Sheet No. 05</b> Orthographic projections - Two objects by first / Third angle projection method, Full orthographic views, Sectional orthographic views (06 Hrs)</p> <p><b>Sheet No. 06</b> Isometric projection - Isometric views of two different objects, Isometric projection of two different objects. (04 Hrs)</p>
<b>Text Books:</b>
<ol style="list-style-type: none"> <li>1. Venugopal K and Prabhu Raja V(2015), “Engineering Graphics”, New AGE International Publishers.</li> <li>2. Narayana,K.L&amp; P Kannaiah(2008),Text book on “Engineering Drawing. SciTech Publication.</li> </ol>
<b>Reference Books:</b>
<ol style="list-style-type: none"> <li>1. N.D. Bhat and V.M. Panchal, Engineering Graphics, Charotar Publishers 2013</li> <li>2. Agrawal B &amp;Agrawal B.C (2008) Engineering Graphics, TMH Publication.</li> </ol>
<b>Guide lines for ICA:</b>
ICA shall be based on continuous evaluation of student performance throughout semester and drawing sheets submitted by the student in the form of journal.
<b>Guidelines for ESE:</b>
ESE will be based on the laboratory assignments submitted by the students in the form of journal.

Workshop Practices LAB					
LAB COURSE OUTLINE					
Course Title:	Workshop Practices ( Lab)		Short Title:	WP (Lab)	Course Code:
Course description:					
This course covers the basic knowledge of different manufacturing methods like sand casting, dies casting, metal casting, forming, machining, joining, CNC machining, additive manufacturing and advanced manufacturing methods. It also covers the fundamentals of fitting operations, power tools, knowledge of electrical & electronics, carpentry tools and equipment, plastic molding, glass cutting, arc welding, gas welding and brazing.					
Laboratory	Hours/week	No. of weeks	Total hours		Semester credits
	02	14	28		02
End Semester Exam (ESE) Pattern:			Oral (OR)		
Prerequisite course(s):					
12 <sup>th</sup> Physics, mathematics, basic knowledge of drawing					
Course objectives:					
<div>1. To study the basics of metal machining.</div> <div>2. To study the different cutting tool materials and types &amp; geometry of cutting tools.</div> <div>3. To learn introductory concepts of additive manufacturing.</div> <div>4. To understand basic manufacturing processes like casting and welding and learn various aspects of casting methods and welding methods.</div> <div>5. To know about the applications of advanced manufacturing processes.</div> <div>6. To understand basics of electrical &amp; electronics, carpentry joints, tools equipment, fitting operations, tools, equipment.</div> <div>7. To understand concepts of plastic molding and glass cutting.</div> <div>8. To get the knowledge of brazing</div>					
Course outcomes:					
Upon successful completion of lab Course, student will be able to:					
<div>1. Students will be able to fabricate components with their own hands.</div> <div>2. Get practical knowledge of the dimensional accuracies and dimensional tolerances possible</div> <div>3. with different manufacturing processes.</div> <div>4. Assemble different components, they will be able to produce small devices of their interest.</div>					
LAB COURSE CONTENT					
Workshop Practices LAB		Semester:		I or II	
Teaching Scheme:		Examination scheme			
Practical:	2 hours/week		End semester exam (ESE):		25 marks
			Internal Continuous Assessment (ICA):		25 marks
Note: - Workshop manual should consist of minimum <b>seven</b> activities from the following list of practicals.					
Students should practice and prepare a job, which consist of following activities in different shops-					
1. Machine shop:					
i) Demonstration of lathe machine (different parts, different operations, different type of cutting tools)					
ii) One job Practice of Facing, Plane Turning, step turning, taper turning, knurling , parting, external or internal thread cuttings, drilling.					

iii) Demonstration of milling machine.

iv) One job Practice of Keyway milling using milling machine.

v) One job Practice of Spur gear cutting using milling machine.

## **2. Smithy Shop:**

i) Demonstration of smithy tools & equipment.

ii) One job Practice of S shape or Hook shape involving bending, flattening operations.

## **3. Foundry Shop:**

i) Demonstration of foundry tools, patterns, ingredients of molding sand.

ii) Demonstration of preparation of mold using split pattern and casting of the same.

## **4. Fitting Shop:**

i) Demonstration of different hand operated power tools, uses and their applications.

ii) One job Practice of T shape and U shape workpiece as per the given dimensions, which contains: filling, drilling and grinding.

## **5. Carpentry Shop:**

i) Demonstration of Carpentry Tools, Equipment and different joints.

ii) One job Practice of Cross Half lap joint or Half lap Dovetail joint.

## **6. House Wiring:**

i) Introduction to House wiring, different types of cables. Types of power supply, types of bulbs, parts of tube light, Electrical wiring symbols.

ii) 2-phase, 3-phase electric supply, earthing, Electric safety.

## **7. Welding Shop:**

i) Demonstration of welding tools, welding joints, symbols and welding equipment (Gas and Arc welding)

ii) Selection of welding electrode and current, and demonstration of brazing.

iii) One job Practice of Lap Joint by arc welding and gas welding.

## **8. CNC Shop:**

i) Demonstration of CNC lathe machine and CNC milling machine.

ii) CNC part programming.

iii) Demonstration of different operations like facing, turning, step turning, taper turning etc. on CNC lathe machine.

Note: - Candidates are required to finish the job to the following limits.

Machine Shop:  $\pm 0.5$  mm, Fitting Shop:  $\pm 0.5$  mm, Carpentry Shop:  $\pm 2$  mm, Smithy Shop:  $\pm 2$  mm, Welding Shop:  $\pm 1$  mm,

## **Text Books:**

1. Hajra choudhury S. K., Hajra Choudhury A. K and Nirjhar Roy "Elements of Workshop Technology" Vol.1 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai.

## **Reference Books:**

1. Kalpakjian S. and Steven S. Schmid, "Manufacturing Engineering and Technology" 4<sup>th</sup> edition, Pearson Education India Edition, 2002.
2. Gowri P. hariharan and A. Suresh Babu, "Manufacturing Technology – I" Pearson education, 2008
3. Roy A. Lindberg, "Processes and Materials of manufacture", 4th Edition, Prentice hall India, 1998.
4. Rao P. N, "Manufacturing Technology", Vol. I and Vol. II. Tata McGraw-Hill house, 2017.

## **Guide lines for ICA:**

Students must submit ICA in the form of journal. Each assignment should be well documented. Faculty in charge will assess the assignments continuously and grade or mark each assignment



on completion date declared for each assignments.
<b>Guidelines for ESE:</b>
ESE will be based on the laboratory assignments submitted by the students in the form of journal.

English Lab					
LAB COURSE OUTLINE					
Course Title:	English(Lab)		Short Title:	ENG (Lab)	Course Code:
Course description:					
The Communicative English Lab focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations and contexts.					
Laboratory	Hours/week	No. of weeks	Total hours	Semester credits	
	02	14	28	01	
End Semester Exam (ESE) Pattern:		Oral (OR)			
Prerequisite course(s):					
11 <sup>th</sup> & 12 <sup>th</sup> English					
Course objectives:					
1. To make students recognize the accents of English through Audio-Visual aids.					
2. To help students build their confidence and help overcome their inhibitions and self-Consciousness while speaking in English. The focus will be on fluency.					
3. To familiarize the students with communicative English.					
Course outcomes:					
Upon successful completion of lab Course, student will be able to:					
1. Students will be sensitized towards recognition of English sound pattern.					
2. The fluency in speech will be enhanced.					
LAB COURSE CONTENT					
English (Lab)		Semester:		I or II	
Teaching Scheme:		Examination scheme			
Practical:	2 hours/week	End semester exam (ESE):		25 marks	
		Internal Continuous Assessment (ICA):		25 marks	
The following course content is prescribed for the English Language Lab based on Unit-6 of AICTE Model Curriculum 2018-19 for B.E First Year.. This unit involves interactive practice sessions in Language Lab .Students should be given practice in listening to the sounds of the language, to be able to recognize them and find the distinction between different sounds, to be able to mark stress and recognize and use the right intonation in sentences.					
• Interactive Practice Sessions in Language Lab:					
1. Listening Comprehension:					
Understand: Listening Skill- Its importance – Purpose- Barriers of Listening.					
Practice: Introduction to Phonetics – Speech Sounds – Vowels and Consonants.					
2. Pronunciation, Intonation, Stress and Rhythm:					
Understand: Word Stress & Sentence Stress , Intonation and rhythm					
Practice: Basic Rules of Word Stress & Sentence Stress					
3. Common Everyday Situations: Conversations and Dialogues:					
Understand: Verbal – Non-verbal Communication.					
Practice: Situational Dialogues – Role-Play- Expressions in Various Situations – Making Requests and Seeking Permissions					
4. Communication at Workplace:					
Understand : Communication at Workplace					

<p>Practice: Communication at Workplace</p> <p><b>5. Interviews:</b>  Understand: Interview Skills.  Practice: Mock Interviews.</p> <p><b>6. Introducing oneself &amp; Introducing others:</b>  Understand : Introduction  Practice: Introducing oneself &amp; Introducing others</p>
<b>Text Book</b>
<ol style="list-style-type: none"> <li>1. Raymond Murrphy, Essential English Grammar, Cambridge University Press, 2<sup>nd</sup> edition</li> <li>2. Rajinder Pal &amp; PremLata , English Grammar &amp;Composition, Sultan chand Publication</li> </ol>
<b>Reference Books:</b>
<ol style="list-style-type: none"> <li>1. Michael Swan, Practical English Usage. OUP, 1995.</li> <li>2. F.T. Wood. Macmillan Remedial English Grammar..2007</li> <li>3. William Zinsser, On Writing Well.. Harper Resource Book. 2001</li> <li>4. Hamp-Lyons and Ben Heasly, Study Writing. Liz Cambridge University Press. 2006.</li> <li>5. Sanjay Kumar and PushpLata, Communication Skills, Oxford University Press. 2011.</li> <li>6. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press</li> </ol>
<b>Guide lines for ICA:</b>
Students must submit ICA in the form of journal. Each assignment should be well documented. Faculty in charge will assess the assignments continuously and grade marks for each assignment on completion date declared for each assignments.
<b>Guidelines for ESE:</b>
ESE will be based on the laboratory assignments submitted by the students in the form of journal.

MATHEMATICS-II					
COURSE OUTLINE					
Course Title:	Mathematics -II		Short Title:	M-II	Course Code:
<b>Course description:</b> This course is aimed at introducing the fundamentals of basic Mathematics to undergraduate students. The background expected includes a prior knowledge of Mathematics from 12th science and familiarity with various laws, principles and theories. The goals of the course are to understand the basic principle of Mathematics and its application in different area.					
Lecture	Hours/week	No. of weeks	Total hours	Semester credits	
	03	14	42	4	
Tutorial	01	14	14		
Prerequisite course(s):11 <sup>th</sup> & 12 <sup>th</sup> mathematics					
<b>Course objectives:</b>					
The objective of this course is to familiarize the prospective engineers with techniques in Multivariate integration, ordinary and partial differential equations and complex variables. It aims to equip the students to deal with advanced level of mathematics and applications that would be essential for their disciplines					
<b>Course outcomes:</b>					
After successful completion of this course the student will be able to:					
1) Use mathematical tools needed in evaluating multiple integrals and their usage. 2) Apply effective mathematical tools for the solutions of differential equations that model physical processes. 3) Use tools of differentiation and integration of functions of a complex variable that are used in various techniques dealing engineering problems.					
COURSE CONTENT					
Mathematics -II		Semester:		II	
Teaching Scheme:		Examination scheme			
Lectures:	3 hours/week	End semester exam (ESE):		60 marks	
Tutorial	1 hours/week	Duration of ESE:		03 hours	
		Internal Sessional Exams (ISE):		40 marks	
Unit-I:		No. of Lectures: 8 Hours		Marks: 12	
<b>First order ordinary differential equations:</b> Exact equations, Integrating Factor, Equations reducible to exact , linear and Bernoulli's equations, <b>Equations not of first degree:</b> equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type.					
Unit-II:		No. of Lectures: 08 Hours		Marks: 12	
Linear Differential Equations with constant coefficients: Linear differential equations with constant coefficients ,Method to find Particular Integral by shortcut methos, method of variation of parameters, Cauchy-Euler equation. Legendres Equations.					
Unit-III:		No. of Lectures: 08 Hours		Marks: 12	
<b>Function of Complex Variable :</b> Differentiation, Cauchy-Riemann equations, analytic functions, harmonic functions, finding harmonic conjugate; zeros of analytic functions, singularities, Cauchy Integral formula (without proof), Cauchy Residue theorem(without proof)					
Unit-IV:		No. of Lectures: 08 Hours		Marks: 12	
<b>Numerical methods:-</b> Solution of Ordinary differential equations: by Taylor's series and Picard's					



Method. Runge-Kutta method of fourth order for solving first order equations. <b>Numerical integration:</b> Trapezoidal rule and Simpson's 1/3rd and 3/8 rules.		
<b>Unit-V:</b>	<b>No. of Lectures: 08 Hours</b>	<b>Marks: 12</b>
<b>Multivariable Calculus (Integration):</b> Double integrals (limits Given and limits not given) by Cartesian and Polar coordinates. Triple integration by spherical polar coordinates. Applications: areas and volumes.		
<b>Text Books :</b>		
1. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008. 2. H.K.DASS "Advance Engineering Mathematics" S. Chand publications. 3. Ravish R. Singh, Mukul Bhatt "Engineering Mathematics A Tutorial Approach.Tata McGrawHill Education Private Limited. New Delhi		
<b>Reference Books:</b>		
1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002. 2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006. 3. W. E. Boyce and R. C. DiPrima, Elementary Differential Equations and Boundary Value Problems, 9th Edn., Wiley India, 2009. 4. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984. 5. E. A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall India,1995. 6. J. W. Brown and R. V. Churchill, Complex Variables and Applications, 7th Ed., McGrawHill, 2004. 7. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010		

**NORTH MAHARASHTRA UNIVERSITY,**

**JALGAON (M.S.)**

**Bachelor of Engineering**

**(Biotechnology Engineering)**

**Faculty of Science and Technology**



**'A' Grade  
NAAC Re-Accredited  
(3<sup>rd</sup> Cycle)**

**SYLLABUS STRUCTURE**

**(As per AICTE Guidelines)**

**W.E.F. 2018 – 19**

## Subject Group Code and Subject Groups

Sr. No.	GROUP	Category	Breakup of Credits (Total 160)
1	A	Humanities and Social Sciences including Management Courses (HSMC)	12
2	B	Basic Science Courses (BSC)	25
3	C	Engineering Science Courses including workshop, drawing, basics of electrical/mechanical/computer etc. (ESC)	24
4	D	Professional Core Courses (PCC)	48
5	E	Professional Elective Courses relevant to chosen specialization/branch (PEC)	18
6	F	Open subjects – Electives from other technical and /or emerging subjects (OEC)	18
7	G	Project work, seminar and internship in industry or appropriate work place/ academic and research institutions in India/abroad (PROJ)	15
8	H	Mandatory Courses (MC) [Environmental Sciences, Induction program, Indian Constitution, Essence of Indian Traditional Knowledge]	
<b>Total</b>			<b>160</b>

**Syllabus Structure for First Year Engineering (Semester – I) (Mechanical, Auto, Civil, Chemical, Biotech.) (w.e.f. 2018 – 19)**

**(As per AICTE Guidelines)**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Chemistry	B	3	1	-	4	40	60	-	-	100	4
Mathematics - I	B	3	1	-	4	40	60	-	-	100	4
Engineering Graphics	C	3	-	-	3	40	60	-	-	100	3
English	A	3	-	-	3	40	60	-	-	100	3
Chemistry Lab	B	-	-	2	2	-	-	25	-	25	1
Engineering Graphics Lab	C	-	-	2	2	-	-	25	25(OR)	50	1
English Lab	A	-	-	2	2	-	-	25	25(OR)	50	1
Workshop Practices	C	1	-	2	3	-	-	25	25(OR)	50	2
Induction Program*	H	-	-	-	-	-	-	-	-	-	0
		13	2	8	23	160	240	100	75	575	19

\* 3-week long Induction Program for students entering the institution, right at the start.

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

**Syllabus Structure for First Year Engineering (Semester – II) (Mechanical, Auto, Civil, Chemical, Biotech.) (w.e.f. 2018 – 19)**

**(As per AICTE Guidelines)**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Physics	B	3	1	-	4	40	60	-	-	100	4
Mathematics - II	B	3	1	-	4	40	60	-	-	100	4
Basic Electrical & Electronics Engineering	C	3	1	-	4	40	60	-	-	100	4
Programming for Problem Solving	C	3	-	-	3	40	60	-	-	100	3
Physics Lab	B	-	-	2	-	-	-	25	-	25	1
Basic Electrical & Electronics Engineering Lab	C	-	-	2	-	-	-	25	25(OR)	50	1
Programming for Problem Solving Lab	C	-	-	2	-	-	-	25	25(OR)	50	1
		12	3	6	21	160	240	75	50	525	18

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**



**Syllabus Structure for Second Year Engineering (Semester – III) (Biotechnology) (w.e.f. 2019 – 20)**

**(As per AICTE Guidelines)**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Biology	B	3	1	-	4	40	60	-	-	100	4
Bioprocess Calculations	C	3	-	-	3	40	60	-	-	100	3
Unit Operations	C	3	-	-	3	40	60	-	-	100	3
Microbiology	D	3	-	-	3	40	60	-	-	100	3
Bioprocess Industrial Economics & Management	A	3	-	-	3	40	60	-	-	100	3
LAB Unit Operations	C	-	-	2	2	-	-	25	25(OR)	50	1
LAB Microbiology	D	-	-	2	2	-	-	25	25(PR)	50	1
LAB Good Manufacturing Practices	D	1	-	2	3	-	-	25	25(OR)	50	2
		16	1	6	23	200	300	75	75	650	20

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

**Syllabus Structure for Second Year Engineering (Semester – IV) (Biotechnology) (w.e.f. 2019 – 20)**

**(As per AICTE Guidelines)**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Biostatistics	B	3	1	-	4	40	60	-	-	100	4
Process Heat Transfer	C	3	-	-	3	40	60	-	-	100	3
Immunology	D	3	-	-	3	40	60	-	-	100	3
Biochemistry	D	3	-	-	3	40	60	-	-	100	3
IPR& Entrepreneurship	A	3	-	-	3	40	60	-	-	100	3
Process Heat Transfer		-	-	2	2	-	-	25	-		1
LAB Immunology		-	-	2	2	-	-	25	25(PR)	50	1
LAB Biochemistry		-	-	2	2	-	-	25	25(PR)	50	1
LAB- Environmental Biotechnology	D	1	-	2	3	-	-	-	25(OR)	50	2
Environmental Science	H	-	-	-	-	-	-	-	-	-	
		16	1	8	25	200	300	75	75	650	21

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

**Syllabus Structure for Third Year Engineering (Semester – V) (Biotechnology) (w.e.f. 2020 – 21)**  
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Molecular Biology	D	3	-	-	3	40	60	-	-	100	3
Reaction Engineering	D	3	-	-	3	40	60	-	-	100	3
Enzyme Engineering	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course –I	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course – I	F	3	-	-	3	40	60	-	-	100	3
LAB Molecular Biology		-	-	2	2	-	-	25	25(OR)	50	1
LAB Reaction Engineering		-	-	2	2	-	-	25	25(OR)	50	1
LAB- Pharmaceutical Biotechnology	D	-	-	2	2	-	-	25	25(OR)	50	1
Minor Project (Stage-I)	G	-	-	6	6	-	-	50	-	50	3
Constitution of India		-	-	-	-	-	-	-	-	-	0
		15	0	12	27	200	300	125	75	700	21

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

Professional Elective Course – I				Open Elective Course – I			
1				1			
2				2			
3				3			
4				4			

**Syllabus Structure for Third Year Engineering (Semester – VI) (Biotechnology) (w.e.f. 2020 – 21)**  
**(As per AICTE Guidelines)**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Genetic Engineering	D	3	-	-	3	40	60	-	-	100	3
Mass Transfer	D	3	-	-	3	40	60	-	-	100	3
Bioprocess Engineering	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – II	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course – II	F	3	-	-	3	40	60	-	-	100	3
LAB Genetic Engineering		-	-	2	2	-	-	25	25(OR)	50	1
LAB Mass Transfer		-	-	2	2	-	-	25	25(OR)	50	1
LAB Bioprocess Engineering		-	-	2	2	-	-	25	-	25	1
Minor Project	G	-	-	6	6	-	-	50	25(OR)	75	3
		15	-	12	27	200	300	125	75	700	21

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

Professional Elective Course – II		Open Elective Course – II	
1		1	
2		2	
3		3	
4		4	

Note: Every student should undergo Summer Internship during Summer Vacation of at least THREE weeks duration. Credits for Summer Internship shall be included in Project (Stage – I) of Semester – VII.

**Syllabus Structure for Fourth Year Engineering (Semester – VII) (Biotechnology) (w.e.f. 2021 – 22)**  
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Bioinformatics	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – III	E	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – IV	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course – III	F	3	-	-	3	40	60	-	-	100	3
LAB Bioinformatics	D	-	-	2	2			25	25(PR)	50	1
LAB Plant Tissue Culture	D	1	-	2	3	-	-	25	25(OR)	50	2
Project (Stage – I)	G		-	12	12	-	-	50	50(OR)	100	6
Essence of Indian Traditional Knowledge		-	-	-	-	-	-	-	-	-	0
		13	-	16	29	160	240	100	100	600	21

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

Professional Elective Course – III		Professional Elective Course – IV		Open Elective Course – III	
1		1		1	
2		2		2	
3		3		3	
4		4		4	



**Syllabus Structure for Fourth Year Engineering (Semester – VIII) (Biotechnology) (w.e.f. 2021 – 22)**  
**(As per AICTE Guidelines)**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Bioprocess Industries	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – V	E	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – VI	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course – IV	F	3	-	-	3	40	60	-	-	100	3
LAB Downstream Processing	D	2	-	2	4	-	-	25	25(OR)	50	3
LAB Bioprocess Industries	D	-	-	2	2	-	-	25	25(OR)	50	1
Project	G	-	-	6	6	-	-	50	50(OR)	100	3
		14	-	12	24	160	240	100	100	600	19

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

Professional Elective Course – V		Professional Elective Course – VI		Open Elective Course – IV	
1		1		1	
2		2		2	
3		3		3	
4		4		4	



**NORTH MAHARASHTRA UNIVERSITY,**

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**Bachelor of Engineering**

**(Chemical Engineering)**

**Faculty of Science and Technology**



**'A' Grade  
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(3<sup>rd</sup> Cycle)**

**SYLLABUS STRUCTURE**

**(As per AICTE Guidelines)**

**W.E.F. 2018 – 19**

## Subject Group Code and Subject Groups

Sr. No.	GROUP	Category	Breakup of Credits (Total 160)
1	A	Humanities and Social Sciences including Management Courses (HSMC)	10
2	B	Basic Science Courses (BSC)	26
3	C	Engineering Science Courses including workshop, drawing, basics of electrical/mechanical/computer etc. (ESC)	26
4	D	Professional Core Courses (PCC)	53
5	E	Professional Elective Courses relevant to chosen specialization/branch (PEC)	18
6	F	Open subjects – Electives from other technical and /or emerging subjects (OEC)	12
7	G	Project work, seminar and internship in industry or appropriate work place/ academic and research institutions in India/abroad (PROJ)	15
8	H	Mandatory Courses (MC) [Environmental Sciences, Induction program, Constitution of India, Essence of Indian Traditional Knowledge]	
<b>Total</b>			<b>160</b>

**Syllabus Structure for First Year Engineering (Semester – I) (Mechanical, Auto, Civil, Chemical, BioTech) wef 2018 – 19**  
**(As per AICTE Guidelines)**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Chemistry	B	3	1	-	4	40	60	-	-	100	4
Mathematics – I	B	3	1	-	4	40	60	-	-	100	4
Engineering Graphics	C	3	-	-	3	40	60	-	-	100	3
English	A	3	-	-	3	40	60	-	-	100	3
Chemistry Lab	B	-	-	2	2	-	-	25	-	25	1
Engineering Graphics Lab	C	-	-	2	2	-	-	25	25	50	1
English Lab	A	-	-	2	2	-	-	25	25	50	1
Workshop Practices	C	1	-	2	3	-	-	25	25	50	2
		13	2	8	23	160	240	100	75	575	19

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

**Syllabus Structure for First Year Engineering (Semester – II) (Mechanical, Auto, Civil, Chemical, Bio Tech) wef 2018 – 19**  
**(As per AICTE Guidelines)**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Physics	B	3	1	-	4	40	60	-	-	100	4
Mathematics – II	B	3	1	-	4	40	60	-	-	100	4
Basic Electrical & Electronics Engineering	C	3	1	-	4	40	60	-	-	100	4
Programming for Problem Solving	C	3	-	-	3	40	60	-	-	100	3
Physics Lab	B	-	-	2	2	-	-	25	-	25	1
Basic Electrical and Electronics Engineering Lab	C	-	-	2	2	-	-	25	25	50	1
Programming for Problem Solving Lab	C	-	-	2	2	-	-	25	25	50	1
Induction Program	H	-	-	-	-	-	-	-	-	-	0
		12	3	6	21	160	240	75	50	525	18

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**



**Syllabus Structure for Second Year Engineering (Semester – III) Chemical Engineering (w.e.f. 2019 – 20)**  
(As per AICTE Guidelines)

Name of the Course	Grou p	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutoria l Hrs / week	Practica l Hrs / week	Total	ISE	ESE	ICA	ESE		
Industrial Chemistry	B	3	1	-	4	40	60	-	-	100	4
Thermodynamics-I	C	3	-	-	3	40	60	-	-	100	3
Engineering and Solid Mechanics	C	3	-	-	3	40	60	-	-	100	3
Fluid Mechanics	D	3	-	-	3	40	60	-	-	100	3
Industrial Organization and Management	A	3	-	-	3	40	60	-	-	100	3
Thermodynamics-I Lab	C	-	-	2	2	-	-	25	25 (OR)	50	1
Fluid Mechanics Lab	D	-	-	2	2			25	25 (OR)	50	1
Chemical Engineering Lab-I	D	1	-	2	3	-	-	25	25 (PR)	50	2
		16	1	6	23	200	300	75	75	650	20

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

**Syllabus Structure for Second Year Engineering (Semester – IV) Chemical Engineering (w.e.f. 2019 – 20)**  
(As per AICTE Guidelines)

Name of the Course	Grou p	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutoria l Hrs / week	Practica l Hrs / week	Total	ISE	ESE	ICA	ESE		
Biology	B	3	1	-	4	40	60	-	-	100	4
Material Science	C	3	-	-	3	40	60	-	-	100	3
Thermodynamics - II	D	3	-	-	3	40	60	-	-	100	3
Material and Energy Balance Computations	D	3	-	-	3	40	60	-	-	100	3
Project Management and Entrepreneurship	A	3	-	-	3	40	60	-	-	100	3
Material Science Lab	C	-	-	2	2	-	-	-	-	-	1
Thermodynamics – II Lab	D	-	-	2	2	-	-	25	25 (OR)	50	1
Material and Energy Balance ComputationsLab	D	-	-	2	2	-	-	25	25 (OR)	50	1
Chemical Engineering Lab-II	D	1	-	2	3	-	-	25	25 (PR)	50	2
Environmental Studies	H	-	-	-	-	-	-	-	-	-	-
		16	1	8	25	200	300	75	75	650	21

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

**Syllabus Structure for Third Year Engineering (Semester – V) Chemical Engineering (w.e.f. 2020 – 21)**  
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Mass Transfer-I	D	3	-	-	3	40	60	-	-	100	3
Chemical Reaction Engineering-I	D	3	-	-	3	40	60	-	-	100	3
Particle and Fluid-Particle Processing	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – I	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course – I	F	3	-	-	3	40	60	-	-	100	3
Mass Transfer-ILab	D	-	-	2	2	-	-	25	25 (PR)	50	1
Chemical Reaction Engineering-ILab	D	-	-	2	2	-	-	25	25 (OR)	50	1
Chemical Engineering Lab-III	D	-	-	2	2	-	-	25	25 (OR)	50	1
Minor Project (Stage - I)	G	-	-	6	6	-	-	50	-	50	3
Constitution of India		-	-								-
		15	0	12	27	200	300	125	75	700	21

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

Professional Elective Course – I	Open Elective Course – I

**Syllabus Structure for Third Year Engineering (Semester – VI) Chemical Engineering (w.e.f. 2020 – 21)**  
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Mass Transfer-II	D	3	-	-	3	40	60	-	-	100	3
Chemical Reaction Engineering-II	D	3	-	-	3	40	60	-	-	100	3
Heat Transfer	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – II	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course – II	F	3	-	-	3	40	60	-	-	100	3
Mass Transfer-IIILab	D	-	-	2	2	-	-	25	25 (PR)	50	1
Chemical Reaction Engineering-II Lab	D	-	-	2	2	-	-	25	25 (OR)	50	1
Heat TransferLab	D	-	-	2	2	-	-	25	-	25	1
Minor Project	G	-	-	6	6	-	-	50	25 (OR)	75	3
		15	0	12	27	200	300	125	75	700	21

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

Professional Elective Course – II	Open Elective Course – II

Note: Every student should undergo Summer Internship during Summer Vacation of at least THREE weeks duration. Credits for Summer Internship shall be included in Project (Stage – I) of Semester – VII.

**Syllabus Structure for Fourth Year Engineering (Semester – VII) Chemical Engineering(w.e.f. 2021 – 22)**  
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Process Control	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – III	E	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – IV	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course – III	F	3	-	-	3	40	60	-	-	100	3
Process Control Lab	D	-	-	2	2	-	-	25	25 (PR)	50	1
(LAB) Instrumentation and Control Lab	D	1	-	2	3	-	-	25	25 (OR)	50	2
Project (Stage - I)	G	-	-	12	12	-	-	50	50 (OR)	100	6
Essence of Indian Traditional Knowledge		-	-	-	-	-	-	-	-	-	-
		13		16	29	160	240	100	100	600	21

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

Professional Elective Course – III	Professional Elective Course – IV	Open Elective Course – III

**Syllabus Structure for Fourth Year Engineering (Semester – VIII) Chemical Engineering (w.e.f. 2021 – 22)**  
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Process Technology and Economics	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – V	E	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – VI	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course – IV	F	3	-	-	3	40	60	-	-	100	3
Process Technology and Economics Lab	D	-	-	2	2	-	-	25	25 (OR)	50	1
(LAB) Design and Simulation	D	2	-	2	4	-	-	25	25 (PR)	50	3
Project	G		-	6	6	-	-	50	50 (OR)	100	3
		14	0	10	24	160	240	100	100	600	19

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

Professional Elective Course – V	Professional Elective Course – VI	Open Elective Course – IV





## Subject Group Code and Subject Groups

Sr. No.	GROUP	Category	Breakup of Credits (Total 160)	
1	A	Humanities and Social Sciences including Management Courses (HSMC)	12	10
2	B	Basic Science Courses (BSC)	25	26
3	C	Engineering Science Courses including workshop, drawing, basics of electrical/mechanical/computer etc. (ESC)	24	26
4	D	Professional Core Courses (PCC)	48	53
5	E	Professional Elective Courses relevant to chosen specialization/branch (PEC)	18	18
6	F	Open subjects – Electives from other technical and /or emerging subjects (OEC)	18	12
7	G	Project work, seminar and internship in industry or appropriate work place/ academic and research institutions in India/abroad (PROJ)	15	15
8	H	Mandatory Courses (MC) [Environmental Sciences, Induction program, Indian Constitution, Essence of Indian Traditional Knowledge]	(non-credit)	
<b>Total</b>			<b>160</b>	<b>160</b>

As per AICTE guidelines

**Syllabus Structure for First Year Engineering (Semester – I) (Mechanical, Auto, Civil, Chemical, BioTech) wef 2018 – 19**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Chemistry	B	3	1	-	4	40	60	-	-	100	4
Mathematics – I	B	3	1	-	4	40	60	-	-	100	4
Engineering Graphics	C	3	-	-	3	40	60	-	-	100	3
English	A	3	-	-	3	40	60	-	-	100	3
Chemistry Lab	B	-	-	2	2	-	-	25	-	25	1
Engineering Graphics Lab	C	-	-	2	2	-	-	25	25	50	1
English Lab	A	-	-	2	2	-	-	25	25	50	1
Workshop Practices	C	1	-	2	3	-	-	25	25	50	2
		13	2	8	23	160	240	100	75	575	19

**As per AICTE guidelines**

**Syllabus Structure for First Year Engineering (Semester – II) (Mechanical, Auto, Civil, Chemical, Bio Tech) wef 2018 – 19**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Physics	B	3	1	-	4	40	60	-	-	100	4
Mathematics – II	B	3	1	-	4	40	60	-	-	100	4
Basic Electrical & Electronics Engineering	C	3	1	-	4	40	60	-	-	100	4
Programming for Problem Solving	C	3	-	-	3	40	60	-	-	100	3
Physics Lab	B	-	-	2	2	-	-	25	-	25	1
Basic Electrical and Electronics Engineering Lab	C	-	-	2	2	-	-	25	25	50	1
Programming for Problem Solving Lab	C	-	-	2	2	-	-	25	25	50	1
Induction Program	H	-	-	-	-	-	-	-	-	-	0
		12	3	6	21	160	240	75	50	525	18

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

As per AICTE guidelines

Syllabus Structure for Second Year Engineering (Semester – III) (Civil) wef 2019 – 20

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical /Oral		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Biology	B	3	1	-	4	40	60	-	-	100	4
Mechanics	C	3	-	-	3	40	60	-	-	100	3
Energy Science and Engineering	C	3	-	-	3	40	60	-	-	100	3
Surveying & Geomatics	D	3	-	-	3	40	60	-	-	100	3
Introduction to Civil Engineering	A	3	-	-	3	40	60	-	-	100	3
Mechanics Lab	C	-	-	2	2	-	-	25	25 OR	50	1
Surveying and Geomatics Lab	D	-	-	2	2	-	-	25	25 PR	50	1
Material, Testing & Evaluation I Lab	D	1	-	2	3	-	-	25	25 OR	50	2
		16	1	6	23	200	300	75	75	650	20

**As per AICTE guidelines**

**Syllabus Structure for Second Year Engineering (Semester – IV) (Civil) wef 2019 – 20**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical/Oral		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Mathematic III	B	3	1	-	4	40	60	-	-	100	4
Computer Aided Civil Engineering Drawing	C	3	-	-	3	40	60	-	-	100	3
Introduction to Fluid Mechanics	D	3	-	-	3	40	60	-	-	100	3
Introduction to Solid Mechanics	D	3	-	-	3	40	60	-	-	100	3
Civil Engineering – Societal & Global Impact	A	3	-	-	3	40	60	-	-	100	3
Computer Aided Civil Engineering Lab	C	-	-	2	2	-	-	-	-	-	1
Introduction to Fluid Mechanics Lab	D	-	-	2	2	-	-	25	25 OR	50	1
Material, Testing & Evaluation II	D	-	-	2	2	-	-	25	25 OR	50	1
Engineering Geology	D	1	-	2	3	-	-	25	25 PR	50	2
Environmental Science	H	-	-	-	-	-	-	-	-	-	-
		16	1	8	25	200	300	75	75	650	21

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**



**As per AICTE guidelines**

**Syllabus Structure for Third Year Engineering (Semester – V) (Civil) wef 2020 – 21**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical/Oral		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Mechanics of Materials	D	3	-	-	3	40	60	-	-	100	3
Hydraulic Engineering	D	3	-	-	3	40	60	-	-	100	3
Geotechnical Engineering	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – I	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course – I	F	3	-	-	3	40	60	-	-	100	3
Hydraulic Engineering LAB	D	-	-	2	2	-	-	25	25 OR	50	1
Geotechnical Engineering LAB	D	-	-	2	2	-	-	25	25 OR	50	1
Disaster preparedness & Planning Management (LAB)	D	-	-	2	2	-	-	25	25 OR	50	1
Minor Project Stage I	G	-	-	6	6	-	-	50	-	50	3
Constitution of India	-	-	-	-	-	-	-	-	-	-	0
		15	0	12	27	200	300	125	75	700	21

**Note: There must be minimum four alternatives given for professional elective courses. The same must be minimum three for open elective course.**

**As per AICTE guidelines**

**Syllabus Structure for Third Year Engineering (Semester – VI) (Civil) wef 2020 – 21**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical/Oral		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Structural Engineering	D	3	-	-	3	40	60	-	-	100	3
Environmental Engineering	D	3	-	-	3	40	60	-	-	100	3
Transportation Engineering	D	3	-	-	3	40	60	-	-	100	3
Professional Elective course II	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course II	F	3	-	-	3	40	60	-	-	100	3
Structural Engineering Lab	D	-	-	2	2	-	-	25	25 OR	50	1
Environmental Engineering Lab	D	-	-	2	2	-	-	25	25 OR	50	1
Transportation Engineering	D	-	-	2	2	-	-	25	-	25	1
Minor Project Stage II	G	-	-	6	6	-	-	50	25 OR	75	3
		15		12	27				75	700	21

**Note:**

1. There must be minimum four alternatives given for professional elective courses. The same must be minimum three for open elective course.
2. Note: Every student should undergo Summer Internship during Summer Vacation of at least THREE weeks duration. Credits for Summer Internship shall be included in Project (Stage – I) of Semester – VII.

**As per AICTE guidelines**

**Syllabus Structure for Fourth Year Engineering (Semester – VII) wef 2021 – 22**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical/Oral		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Hydrology & Water Resources Engineering	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course III	E	3	-	-	3	40	60	-	-	100	3
Professional Elective Course IV	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course III	F	3	-	-	3	40	60	-	-	100	3
Hydrology & Water Resources Engineering LAB	D	-	-	2	2	-	-	25	25 OR	50	1
Construction Engineering & Management (LAB)	D	1	-	2	3	-	-	25	25 OR	50	2
Major Project Stage I	G	-	-	12	12	-	-	50	50 OR	100	6
Essence of India Traditional Knowledge		-	-	-	-	-	-	-	-	-	0
		13		16	29	160	240	100	100	600	21

**Note: There must be minimum four alternatives given for professional elective courses. The same must be minimum three for open elective course.**

**As per AICTE guidelines**

**Syllabus Structure for Fourth Year Engineering (Semester – VIII) (Civil) wef 2021 – 22**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical/Oral		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Engineering Economy, Estimation & Costing	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course V	E	3	-	-	3	40	60	-	-	100	3
Professional Elective Course VI	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course IV	F	3	-	-	3	40	60	-	-	100	3
Engineering Economy, Estimation & Costing LAB	D	-	-	2	2	-	-	25	25 OR	50	1
Remote sensing (LAB)	D	2	-	2	4	-	-	25	25 OR	50	3
Major Project Stage II	G	-	-	6	6	-	-	50	50 OR	100	3
		14	0	12	24	160	240	100	100	600	19

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

**Note: There must be minimum four alternatives given for professional elective courses. The same must be minimum three for open elective course.**

**As per AICTE guidelines**

**NORTH MAHARASHTRA UNIVERSITY,**

**JALGAON (M.S.)**

**Bachelor of Engineering**

**(Computer Engineering)**

**Faculty of Science and Technology**



**‘A’ Grade  
NAAC Re-Accredited  
(3<sup>rd</sup> Cycle)**

**SYLLABUS STRUCTURE**

**(As per AICTE Guidelines)**

**W.E.F. 2018 – 19**

## Subject Group Code and Subject Groups

Sr. No.	GROUP	Category	Breakup of Credits
1	A	Humanities and Social Sciences including Management Courses (HSMC)	10
2	B	Basic Science Courses (BSC)	26
3	C	Engineering Science Courses including workshop, drawing, basics of electrical/mechanical/computer etc. (ESC)	26
4	D	Professional Core Courses (PCC)	53
5	E	Professional Elective Courses relevant to chosen specialization/branch (PEC)	18
6	F	Open subjects – Electives from other technical and /or emerging subjects (OEC)	12
7	G	Project work, seminar and internship in industry or appropriate work place/ academic and research institutions in India/abroad (PROJ)	15
8	H	Mandatory Courses (MC) [Environmental Sciences, Induction program, Indian Constitution, Essence of Indian Traditional Knowledge]	
<b>Total</b>			<b>160</b>



**Syllabus Structure for First Year Engineering (Semester – I) (Computer, IT, Electrical, E & TC, Instrumentation) (w.e.f. 2018 – 19)**  
**(As per AICTE Guidelines)**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Physics	B	3	1	-	4	40	60	-	-	100	4
Mathematics - I	B	3	1	-	4	40	60	-	-	100	4
Basic Electrical & Electronics Engineering	C	3	1	-	4	40	60	-	-	100	4
Programming for Problem Solving	C	3	-	-	3	40	60	-	-	100	3
Physics Lab	B	-	-	2	2	-	-	25	-	25	1
Basic Electrical & Electronics Engineering Lab	C	-	-	2	2	-	-	25	25 (OR)	50	1
Programming for Problem Solving Lab	C	-	-	2	2	-	-	25	25 (OR)	50	1
Induction Program*	H	-	-	-	-	-	-	-	-	-	-
		12	3	6	21	160	240	75	50	525	18

\* 3-week long Induction Program for students entering the institution, right at the start.

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

**Syllabus Structure for First Year Engineering (Semester – II) (Computer, IT, Electrical, E & TC, Instrumentation) (w.e.f. 2018 – 19)**  
**(As per AICTE Guidelines)**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Chemistry	B	3	1	-	4	40	60	-	-	100	4
Mathematics – II	B	3	1		4	40	60	-	-	100	4
Engineering Graphics	C	3	-	-	3	40	60	-	-	100	3
English	A	3		-	3	40	60	-	-	100	3
Chemistry Lab	B	-	-	2	2	-	-	25	-	25	1
Engineering Graphics Lab	C	-	-	2	2	-	-	25	25 (OR)	50	1
English Lab	A	-	-	2	2	-	-	25	25 (OR)	50	1
Workshop Practices	C	1	-	2	3	-	-	25	25 (OR)	50	2
		13	2	8	23	160	240	100	75	575	19

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

**Syllabus Structure for Second Year Engineering (Semester – III) (Computer, IT) (w.e.f. 2019 – 20)**  
**(As per AICTE Guidelines)**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Mathematics – III	B	3	1	-	4	40	60	-	-	100	4
Signals and Systems	C	3	-	-	3	40	60	-	-	100	3
Analog Electronic Circuits	C	3	-	-	3	40	60	-	-	100	3
Discrete Mathematics	D	3	-	-	3	40	60	-	-	100	3
Organizational Behavior	A	3	-	-	3	40	60	-	-	100	3
Analog Electronic Circuits Lab	C	-	-	2	2	-	-	25	25 (PR)	50	1
Discrete Mathematics Lab	D	-	-	2	2			25	25 (PR)	50	1
Object Oriented Programming Lab	D	1	-	2	3	-	-	25	25 (PR)	50	2
		16	1	6	23	200	300	75	75	650	20

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

**Syllabus Structure for Second Year Engineering (Semester – IV) (Computer, IT) (w.e.f. 2019 – 20)**  
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Biology	B	3	1	-	4	40	60	-	-	100	4
Digital Electronics	C	3	-	-	3	40	60	-	-	100	3
Data structure & Algorithms	D	3	-	-	3	40	60	-	-	100	3
Computer Organization & Architecture	D	3	-	-	3	40	60	-	-	100	3
Finance & Accounting	A	3	-	-	3	40	60	-	-	100	3
Digital Electronics Lab	C	-	-	2	2	-	-	-	-	-	1
Data structure & Algorithms Lab	D	-	-	2	2	-	-	25	25 (PR)	50	1
Computer Organization & Architecture Lab	D	-	-	2	2	-	-	25	25 (PR)	50	1
IT Workshop	D	1	-	2	3	-	-	25	25 (PR)	50	2
Environmental Studies	H	-	-	-	-	-	80	20	-	-	-
		16	1	8	25	200	300	75	75	650	21

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

**Syllabus Structure for Third Year Engineering (Semester – V) (Computer) (w.e.f. 2020 – 21)**  
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Database Management Systems	D	3	-	-	3	40	60	-	-	100	3
Design and Analysis of Algorithms	D	3	-	-	3	40	60	-	-	100	3
Formal Language, Automats and Compiler	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – I	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course – I	F	3	-	-	3	40	60	-	-	100	3
Database Management Systems Lab	D	-	-	2	2	-	-	25	25 (PR)	50	1
Design and Analysis of Algorithms Lab	D	-	-	2	2	-	-	25	25 (PR)	50	1
Web Programming Language Lab	D	-	-	2	2	-	-	25	25 (PR)	50	1
Minor Project (Stage – I)	G	-	-	6	6	-	-	50	-	50	3
Constitution of India	H	-	-	-	-	-	-	-	-	-	-
		15	0	12	27	200	300	125	75	700	21

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

Professional Elective Course – I				Open Elective Course – I			
1				1			
2				2			
3				3			
4				4			

**Syllabus Structure for Third Year Engineering (Semester – VI) (Computer) (w.e.f. 2020 – 21)**  
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Operating Systems	D	3	-	-	3	40	60	-	-	100	3
Computer Networks	D	3	-	-	3	40	60	-	-	100	3
Software Engineering	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – II	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course – II	F	3	-	-	3	40	60	-	-	100	3
Operating Systems Lab	D	-	-	2	2	-	-	25	25 (PR)	50	1
Computer Networks	D	-	-	2	2	-	-	25	25 (PR)	50	1
Software Engineering Lab	D	-	-	2	2	-	-	25	-	25	1
Minor Project	G	-	-	6	6	-	-	50	25 (OR)	75	3
		15	0	12	27	200	300	125	75	700	21

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

Professional Elective Course – II				Open Elective Course – II			
1				1			
2				2			
3				3			
4				4			

Note: Every student should undergo Summer Internship during Summer Vacation of at least THREE weeks duration. Credits for Summer Internship shall be included in Project (Stage – I) of Semester – VII.

**Syllabus Structure for Fourth Year Engineering (Semester – VII) (Computer) (w.e.f. 2021 – 22)**  
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Complier Design	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – III	E	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – IV	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course – III	F	3	-	-	3	40	60	-	-	100	3
Complier Design Lab	D	-	-	2	2	-	-	25	25 (PR)	50	1
Advanced Technology Lab - I	D	1	-	2	3	-	-	25	25 (OR)	50	2
Project (Stage – I)	G	-	-	12	12	-	-	50	50 (OR)	100	6
Essence of Indian Traditional Knowledge	H	-	-	-	-	-	-	-	-	-	-
		13		16	29	160	240	100	100	600	21

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

Professional Elective Course – III		Professional Elective Course – IV		Open Elective Course – III	
1		1		1	
2		2		2	
3		3		3	
4		4		4	



**Syllabus Structure for Fourth Year Engineering (Semester – VIII) (Computer) (w.e.f. 2021 – 22)**  
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Cryptography and Network Security	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – V	E	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – VI	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course – IV	F	3	-	-	3	40	60	-	-	100	3
Cryptography and Network Security Lab	D	-	-	2	2	-	-	25	25 (PR)	50	1
Advanced Technology Lab - II	D	2	-	2	4	-	-	25	25 (OR)	50	3
Project	G		-	6	6	-	-	50	50 (OR)	100	3
		14	0	10	24	160	240	100	100	600	19

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

Professional Elective Course – V		Professional Elective Course – VI		Open Elective Course – IV	
1		1		1	
2		2		2	
3		3		3	
4		4		4	

**NORTH MAHARASHTRA UNIVERSITY,**

**JALGAON (M.S.)**

**Bachelor of Engineering**

**(Electrical Engineering)**

**Faculty of Science and Technology**



**‘A’ Grade  
NAAC Re-Accredited  
(3<sup>rd</sup> Cycle)**

**SYLLABUS STRUCTURE**

**(As per AICTE Guidelines)**

**W.E.F. 2018 – 19**

### Subject Group Code and Subject Groups

<b>Sr. No.</b>	<b>GROUP</b>	<b>Category</b>	<b>Breakup of Credits</b>
<b>1</b>	<b>A</b>	Humanities and Social Sciences including Management Courses (HSMC)	<b>10</b>
<b>2</b>	<b>B</b>	Basic Science Courses (BSC)	<b>26</b>
<b>3</b>	<b>C</b>	Engineering Science Courses including workshop, drawing, basics of electrical/mechanical/computer etc. (ESC)	<b>26</b>
<b>4</b>	<b>D</b>	Professional Core Courses (PCC)	<b>53</b>
<b>5</b>	<b>E</b>	Professional Elective Courses relevant to chosen specialization/branch (PEC)	<b>18</b>
<b>6</b>	<b>F</b>	Open subjects – Electives from other technical and / or emerging subjects (OEC)	<b>12</b>
<b>7</b>	<b>G</b>	Project work, seminar and internship in industry or appropriate work place/ academic and research institutions in India/abroad (PROJ)	<b>15</b>
<b>8</b>	<b>H</b>	Mandatory Courses (MC) [Environmental Sciences, Induction program, Constitution of Indian, Essence of Indian Traditional Knowledge]	
<b>Total</b>			<b>160</b>

**Syllabus Structure for First Year Engineering (Semester – I) (w. e. f. 2018 – 19)**  
**(As per AICTE Guidelines)**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practic al Hrs / week	Total	ISE	ESE	ICA	ESE		
Physics	B	3	1	-	4	40	60	-	-	100	4
Mathematics - I	B	3	1	-	4	40	60	-	-	100	4
Basic Electrical & Electronics Engineering	C	3	1	-	4	40	60	-	-	100	4
Programming for Problem Solving	C	3	-	-	3	40	60	-	-	100	3
Physics Lab	B	-	-	2	2	-	-	25	-	25	1
Basic Electrical & Electronics Engineering Lab	C	-	-	2	2	-	-	25	25(OR)	50	1
Programming for Problem Solving Lab	C	-	-	2	2	-	-	25	25(OR)	50	1
Induction Program	H	-	-	-	-	-	-	-	-	-	-
		12	3	6	21	160	240	75	50	525	18

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

**\* 3-week long Induction Program for students entering the institution, right at the start.**

**Syllabus Structure for First Year Engineering (Semester – II) (w. e. f. 2018 – 19)**  
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Chemistry	B	3	1	-	4	40	60	-	-	100	4
Mathematics – II	B	3	1		4	40	60	-	-	100	4
Engineering Graphics	C	3	-	-	3	40	60	-	-	100	3
English	A	3		-	3	40	60	-	-	100	3
Chemistry Lab	B	-	-	2	2	-	-	25	-	25	1
Engineering Graphics Lab	C	-	-	2	2	-	-	25	25(OR)	50	1
English Lab	A	-	-	2	2	-	-	25	25(OR)	50	1
Workshop Practices	C	1	-	2	3	-	-	25	25(OR)	50	2
		13	2	8	23	160	240	100	75	575	19

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

**Syllabus Structure for Second Year Engineering (Semester – III) (Electrical) (w. e. f. 2019 – 20)**  
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Mathematics – III	B	3	1	-	4	40	60	-	-	100	4
Engineering Mechanics	C	3	-	-	3	40	60	-	-	100	3
Electrical Circuit Analysis	C	3	-	-	3	40	60	-	-	100	3
Electrical Machine-I	D	3	-	-	3	40	60	-	-	100	3
Industrial Organization and Management	A	3	-	-	3	40	60	-	-	100	3
Electrical Circuit Analysis Lab	C	-	-	2	2	-	-	25	25(PR)	50	1
Electrical Machine-I Lab	D	-	-	2	2			25	25(PR)	50	1
Electrical Workshop Laboratory	D	1	-	2	3	-	-	25	25(OR)	50	2
		16	1	6	23	200	300	75	75	650	20

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

**Syllabus Structure for Second Year Engineering (Semester – IV) (Electrical) (w. e. f. 2019 – 20)**  
**(As per AICTE Guidelines)**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Biology	B	3	1	-	4	40	60	-	-	100	4
Electrical Engineering Materials	C	3	-	-	3	40	60	-	-	100	3
Analog and Digital Electronics	D	3	-	-	3	40	60	-	-	100	3
Electrical Machine-II	D	3	-	-	3	40	60	-	-	100	3
Entrepreneurship Development	A	3	-	-	3	40	60	-	-	100	3
Electrical Engineering Materials Lab	C	-	-	2	2	-	-	-	-	-	1
Analog and Digital Electronics Lab	D	-	-	2	2	-	-	25	25(PR)	50	1
Electrical Machine-II Lab	D	-	-	2	2	-	-	25	25(PR)	50	1
Measurement and Instrumentation Laboratory	D	1	-	2	3	-	-	25	25(OR)	50	2
Environmental Studies*	H	-	-	-	-	-	80	20	-	100	-
		16	1	8	25	200	300	75	75	650	21

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

**Syllabus Structure for Third Year Engineering (Semester – V) (Electrical) (w. e. f. 2020 – 21)**  
**(As per AICTE Guidelines)**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Power Electronics	D	3	-	-	3	40	60	-	-	100	3
Power System-I	D	3	-	-	3	40	60	-	-	100	3
Electromagnetic Field	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – I	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course – I	F	3	-	-	3	40	60	-	-	100	3
Power Electronics Lab	D	-	-	2	2	-	-	25	25(PR)	50	1
Power System-I Lab	D	-	-	2	2	-	-	25	25(OR)	50	1
Electronics Design Laboratory	D	-	-	2	2	-	-	25	25(OR)	50	1
Minor Project	G	-	-	6	6	-	-	50	-	50	3
Constitution of India		-	-								-
		15	0	12	27	200	300	125	75	700	21

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

Professional Elective Course – I				Open Elective Course – I			
1				1			
2				2			
3				3			
4				4			



**Syllabus Structure for Third Year Engineering (Semester – VI) (Electrical) (w. e. f. 2020 – 21)**  
**(As per AICTE Guidelines)**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Control System	D	3	-	-	3	40	60	-	-	100	3
Microprocessor and Microcontroller	D	3	-	-	3	40	60	-	-	100	3
Power System-II	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – II	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course – II	F	3	-	-	3	40	60	-	-	100	3
Control System Lab	D	-	-	2	2	-	-	25	25(OR)	50	1
Microprocessor and Microcontroller Lab	D	-	-	2	2	-	-	25	25(PR)	50	1
Power System-II Lab	D	-	-	2	2	-	-	25	-	25	1
Minor Project (Stage -I)	G	-	-	6	6	-	-	50	25(OR)	75	3
		15	0	12	27	200	300	125	75	700	21

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

Professional Elective Course – II				Open Elective Course – II			
1				1			
2				2			
3				3			
4				4			

Note: Every student should undergo Summer Internship during Summer Vacation of at least THREE weeks duration. Credits for Summer Internship shall be included in Project (Stage – I) of Semester – VII.

**Syllabus Structure for Fourth Year Engineering (Semester – VII) (Electrical) (w. e. f. 2021 – 22)**  
**(As per AICTE Guidelines)**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Power System Protection	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course -III	E	3	-	-	3	40	60	-	-	100	3
Professional Elective Course -IV	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course – III	F	3	-	-	3	40	60	-	-	100	3
Power System Protection Lab	D	-	-	2	2	-	-	25	25(PR)	50	1
High Voltage Laboratory	D	1	-	2	3	-	-	25	25(OR)	50	2
Project (Stage -I)	G	-	-	12	12	-	-	50	50(OR)	100	6
Essence of Indian Traditional Knowledge		-	-	-	-	-	-	-	-	-	-
		13		16	29	160	240	100	100	600	21

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

Professional Elective Course – III		Professional Elective Course – IV		Open Elective Course – III	
1		1		1	
2		2		2	
3		3		3	
4		4		4	

**Syllabus Structure for Fourth Year Engineering (Semester – VIII) (Electrical) (w. e. f. 2021 – 22)**  
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Electrical Drives	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course - V	E	3	-	-	3	40	60	-	-	100	3
Professional Elective Course -VI	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course - IV	F	3	-	-	3	40	60	-	-	100	3
Electrical Drives Lab	D	-	-	2	2	-	-	25	25(PR)	50	1
Computer Aided Power System Analysis Laboratory	D	2	-	2	4	-	-	25	25(OR)	50	3
Project	G		-	6	6	-	-	50	50(OR)	100	3
		14	0	10	24	160	240	100	100	600	19

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

Professional Elective Course – V		Professional Elective Course – VI		Open Elective Course – IV	
1		1		1	
2		2		2	
3		3		3	
4		4		4	



**NORTH MAHARASHTRA UNIVERSITY,  
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**Bachelor of Engineering  
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**Faculty of Science and Technology**



**'A' Grade  
NAAC Re-Accredited  
(3<sup>rd</sup> Cycle)**

**SYLLABUS STRUCTURE**

**(As per AICTE Guidelines)**

**W.E.F. 2018 – 19**

## Subject Group Code and Subject Groups

<b>Sr. No.</b>	<b>GROUP</b>	<b>Category</b>	<b>Breakup of Credits (Total 160)</b>
<b>1</b>	<b>A</b>	Humanities and Social Sciences including Management Courses (HSMC)	<b>10</b>
<b>2</b>	<b>B</b>	Basic Science Courses (BSC)	<b>26</b>
<b>3</b>	<b>C</b>	Engineering Science Courses including workshop, drawing, basics of electrical/mechanical/computer etc. (ESC)	<b>26</b>
<b>4</b>	<b>D</b>	Professional Core Courses (PCC)	<b>53</b>
<b>5</b>	<b>E</b>	Professional Elective Courses relevant to chosen specialization/branch (PEC)	<b>18</b>
<b>6</b>	<b>F</b>	Open subjects – Electives from other technical and /or emerging subjects (OEC)	<b>12</b>
<b>7</b>	<b>G</b>	Project work, seminar and internship in industry or appropriate work place/ academic and research institutions in India/abroad (PROJ)	<b>15</b>
<b>8</b>	<b>H</b>	Mandatory Courses (MC) [Environmental Sciences, Induction program, Indian Constitution, Essence of Indian Traditional Knowledge]	
<b>Total</b>			<b>160</b>

**Syllabus Structure for First Year Engineering (Semester – I) (Computer, IT, Electrical, E & TC, Instrumentation) (w.e.f. 2018 – 19)**  
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Physics	B	3	1	-	4	40	60	-	-	100	4
Mathematics - I	B	3	1	-	4	40	60	-	-	100	4
Basic Electrical & Electronics Engineering	C	3	1	-	4	40	60	-	-	100	4
Programming for Problem Solving	C	3	-	-	3	40	60	-	-	100	3
Physics Lab	B	-	-	2	2	-	-	25	-	25	1
Basic Electrical & Electronics Engineering Lab	C	-	-	2	2	-	-	25	25(OR)	50	1
Programming for Problem Solving Lab	C	-	-	2	2	-	-	25	25(OR)	50	1
Induction Program*	H	-	-	-	-	-	-	-	-	-	-
		12	3	6	21	160	240	75	50	525	18

\* 3-week long Induction Program for students entering the institution, right at the start.

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

**Syllabus Structure for First Year Engineering (Semester – II) (Computer, IT, Electrical, E & TC, Instrumentation) (w.e.f. 2018 – 19)**  
**(As per AICTE Guidelines)**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Chemistry	B	3	1	-	4	40	60	-	-	100	4
Mathematics – II	B	3	1		4	40	60	-	-	100	4
Engineering Graphics	C	3	-	-	3	40	60	-	-	100	3
English	A	3		-	3	40	60	-	-	100	3
Chemistry Lab	B	-	-	2	2	-	-	25	-	25	1
Engineering Graphics Lab	C	-	-	2	2	-	-	25	25(OR)	50	1
English Lab	A	-	-	2	2	-	-	25	25(OR)	50	1
Workshop Practices	C	1	-	2	3	-	-	25	25(OR)	50	2
		13	2	8	23	160	240	100	75	575	19

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**



**Syllabus Structure for Second Year Engineering (Semester – III) ( E & TC) (w.e.f. 2019 – 20)**  
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Mathematics-III	B	3	1	-	4	40	60	-	-	100	4
Electrical Machines	C	3	-	-	3	40	60	-	-	100	3
Solid State Devices and Circuits	C	3	-	-	3	40	60	-	-	100	3
Digital System Design	D	3	-	-	3	40	60	-	-	100	3
Industrial Organization and Management	A	3	-	-	3	40	60	-	-	100	3
Programing Language-I Lab	C	-	-	2	2	-	-	25	25(PR)	50	1
Digital System Design Lab	D	-	-	2	2			25	25(PR)	50	1
Electronic Devices and Circuits Lab	D	1	-	2	3	-	-	25	25(PR)	50	2
		16	1	6	23	200	300	75	75	650	20

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

**Syllabus Structure for Second Year Engineering (Semester – IV) ( E & TC) (w.e.f. 2019 – 20)**  
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Biology	B	3	1	-	4	40	60	-	-	100	4
Network and Lines	C	3	-	-	3	40	60	-	-	100	3
Analog and Digital Communication	D	3	-	-	3	40	60	-	-	100	3
Analog Circuits	D	3	-	-	3	40	60	-	-	100	3
Enter. Development program	A	3	-	-	3	40	60	-	-	100	3
Electronics Workshop	C	-	-	2	2	-	-	-	-	-	1
Analog and Digital Communication Lab	D	-	-	2	2	-	-	25	25(PR)	50	1
Analog Circuit Lab	D	-	-	2	2	-	-	25	25(PR)	50	1
Electronics Network Lab	D	1	-	2	3	-	-	25	25(PR)	50	2
*Environment Studies	H	-	-	-	-	20	80	-	-	-	-
		16	1	8	25	200	300	75	75	650	21

**\*Only for directly admitted students for second year after Diploma.**

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

**Syllabus Structure for Third Year Engineering (Semester – V) (E&TC) (w.e.f. 2020 – 21)**  
**(As per AICTE Guidelines)**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Microcontrollers	D	3	-	-	3	40	60	-	-	100	3
Electromagnetic Waves	D	3	-	-	3	40	60	-	-	100	3
Signals and System	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – I	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course – I	F	3	-	-	3	40	60	-	-	100	3
Microcontrollers Lab	D	-	-	2	2	-	-	25	25(PR)	50	1
Signals and System Lab	D	-	-	2	2	-	-	25	25(PR)	50	1
Power Devices and Circuits Lab	D	-	-	2	2	-	-	25	25(PR)	50	1
Mini Project ( Stage-I )	G	-	-	6	6	-	-	50	-	50	3
Constitution of Indian		-	-								-
		15	0	12	27	200	300	125	75	700	21

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

Professional Elective Course – I	Open Elective Course – I

**Syllabus Structure for Third Year Engineering (Semester – VI) (E&TC) (w.e.f. 2020 – 21)**  
**(As per AICTE Guidelines)**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Control System	D	3	-	-	3	40	60	-	-	100	3
Electronic Measurement	D	3	-	-	3	40	60	-	-	100	3
Electronics Design	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – II	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course – II	F	3	-	-	3	40	60	-	-	100	3
Electronics Design Lab	D	-	-	2	2	-	-	25	25(PR)	50	1
Elect. Measurement Lab	D	-	-	2	2	-	-	25	25(PR)	50	1
Control system Lab	D	-	-	2	2	-	-	25	-	25	1
Minor Project	G	-	-	6	6	-	-	50	25(OR)	75	3
		15	0	12	27	200	300	125	75	700	21

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

Professional Elective Course – II	Open Elective Course – II

Note: Every student should undergo Summer Internship during Summer Vacation of at least THREE weeks duration. Credits for Summer Internship shall be included in Project (Stage – I) of Semester – VII.

**Syllabus Structure for Fourth Year Engineering (Semester – VII) (E&TC) (w.e.f. 2021 – 22)**  
**(As per AICTE Guidelines)**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Computer Network	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – III	E	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – IV	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course – III	F	3	-	-	3	40	60	-	-	100	3
Communication Lab-I	D	-	-	2	2	-	-	25	25(PR)	50	1
Computer Network Lab	D	1	-	2	3	-	-	25	25(PR)	50	2
Project stage -I	G	-	-	12	12	-	-	50	50(OR)	100	6
Essence of Indian Traditional Knowledge		-	-	-	-	-	-	-	-	-	-
		13		16	29	160	240	100	100	600	21

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

Professional Elective Course – III	Professional Elective Course – IV	Open Elective Course – III

**Syllabus Structure for Fourth Year Engineering (Semester – VIII) (E&TC) (w.e.f. 2021 – 22)**  
**(As per AICTE Guidelines)**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Digital Signal Processing	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course –V	E	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – VI	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course – IV	F	3	-	-	3	40	60	-	-	100	3
Communication Lab-II	D	-	-	2	2	-	-	25	25(PR)	50	1
PCC (Lab)	D	2	-	2	4	-	-	25	25(OR)	50	3
Project	G		-	6	6	-	-	50	50(OR)	100	3
		14	0	10	24	160	240	100	100	600	19

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

Professional Elective Course – V	Professional Elective Course – VI	Open Elective Course – IV



**NORTH MAHARASHTRA UNIVERSITY,**

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**Bachelor of Engineering**

**(Information Technology)**

**Faculty of Science and Technology**



**‘A’ Grade  
NAAC Re-Accredited  
(3<sup>rd</sup> Cycle)**

**SYLLABUS STRUCTURE**

**(As per AICTE Guidelines)**

**W.E.F. 2018 – 19**



## Subject Group Code and Subject Groups

Sr. No.	GROUP	Category	Breakup of Credits
1	A	Humanities and Social Sciences including Management Courses (HSMC)	10
2	B	Basic Science Courses (BSC)	26
3	C	Engineering Science Courses including workshop, drawing, basics of electrical/mechanical/computer etc. (ESC)	26
4	D	Professional Core Courses (PCC)	53
5	E	Professional Elective Courses relevant to chosen specialization/branch (PEC)	18
6	F	Open subjects – Electives from other technical and /or emerging subjects (OEC)	12
7	G	Project work, seminar and internship in industry or appropriate work place/ academic and research institutions in India/abroad (PROJ)	15
8	H	Mandatory Courses (MC) [Environmental Sciences, Induction program, Indian Constitution, Essence of Indian Traditional Knowledge]	
<b>Total</b>			<b>160</b>

**Syllabus Structure for First Year Engineering (Semester – I) (Computer, IT, Electrical, E & TC, Instrumentation) (w.e.f. 2018 – 19)**  
**(As per AICTE Guidelines)**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Physics	B	3	1	-	4	40	60	-	-	100	4
Mathematics - I	B	3	1	-	4	40	60	-	-	100	4
Basic Electrical & Electronics Engineering	C	3	1	-	4	40	60	-	-	100	4
Programming for Problem Solving	C	3	-	-	3	40	60	-	-	100	3
Physics Lab	B	-	-	2	2	-	-	25	-	25	1
Basic Electrical & Electronics Engineering Lab	C	-	-	2	2	-	-	25	25 (OR)	50	1
Programming for Problem Solving Lab	C	-	-	2	2	-	-	25	25 (OR)	50	1
Induction Program*	H	-	-	-	-	-	-	-	-	-	-
		12	3	6	21	160	240	75	50	525	18

\* 3-week long Induction Program for students entering the institution, right at the start.

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

**Syllabus Structure for First Year Engineering (Semester – II) (Computer, IT, Electrical, E & TC, Instrumentation) (w.e.f. 2018 – 19)**  
**(As per AICTE Guidelines)**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Chemistry	B	3	1	-	4	40	60	-	-	100	4
Mathematics – II	B	3	1		4	40	60	-	-	100	4
Engineering Graphics	C	3	-	-	3	40	60	-	-	100	3
English	A	3		-	3	40	60	-	-	100	3
Chemistry Lab	B	-	-	2	2	-	-	25	-	25	1
Engineering Graphics Lab	C	-	-	2	2	-	-	25	25 (OR)	50	1
English Lab	A	-	-	2	2	-	-	25	25 (OR)	50	1
Workshop Practices	C	1	-	2	3	-	-	25	25 (OR)	50	2
		13	2	8	23	160	240	100	75	575	19

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

**Syllabus Structure for Second Year Engineering (Semester – III) (Computer, IT) (w.e.f. 2019 – 20)**  
**(As per AICTE Guidelines)**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Mathematics – III	B	3	1	-	4	40	60	-	-	100	4
Signals and Systems	C	3	-	-	3	40	60	-	-	100	3
Analog Electronic Circuits	C	3	-	-	3	40	60	-	-	100	3
Discrete Mathematics	D	3	-	-	3	40	60	-	-	100	3
Organizational Behavior	A	3	-	-	3	40	60	-	-	100	3
Analog Electronic Circuits Lab	C	-	-	2	2	-	-	25	25 (PR)	50	1
Discrete Mathematics Lab	D	-	-	2	2			25	25 (PR)	50	1
Object Oriented Programming Lab	D	1	-	2	3	-	-	25	25 (PR)	50	2
		16	1	6	23	200	300	75	75	650	20

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

**Syllabus Structure for Second Year Engineering (Semester – IV) (Computer, IT) (w.e.f. 2019 – 20)**  
**(As per AICTE Guidelines)**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Biology	B	3	1	-	4	40	60	-	-	100	4
Digital Electronics	C	3	-	-	3	40	60	-	-	100	3
Data structure & Algorithms	D	3	-	-	3	40	60	-	-	100	3
Computer Organization & Architecture	D	3	-	-	3	40	60	-	-	100	3
Finance & Accounting	A	3	-	-	3	40	60	-	-	100	3
Digital Electronics Lab	C	-	-	2	2	-	-	-	-	-	1
Data structure & Algorithms Lab	D	-	-	2	2	-	-	25	25 (PR)	50	1
Computer Organization & Architecture Lab	D	-	-	2	2	-	-	25	25 (PR)	50	1
IT Workshop	D	1	-	2	3	-	-	25	25 (PR)	50	2
Environmental Studies	H	-	-	-	-	-	80	20	-	-	-
		16	1	8	25	200	300	75	75	650	21

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

**Syllabus Structure for Third Year Engineering (Semester – V) (Information Technology) (w.e.f. 2020 – 21)**  
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Database Management Systems	D	3	-	-	3	40	60	-	-	100	3
Design and Analysis of Algorithms	D	3	-	-	3	40	60	-	-	100	3
Formal Language, Automats and Compiler	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – I	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course – I	F	3	-	-	3	40	60	-	-	100	3
Database Management Systems Lab	D	-	-	2	2	-	-	25	25 (PR)	50	1
Design and Analysis of Algorithms Lab	D	-	-	2	2	-	-	25	25 (PR)	50	1
Web Programming Language Lab	D	-	-	2	2	-	-	25	25 (PR)	50	1
Minor Project (Stage – I)	G	-	-	6	6	-	-	50	-	50	3
Constitution of India	H	-	-	-	-	-	-	-	-	-	-
		15	0	12	27	200	300	125	75	700	21

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

Professional Elective Course – I				Open Elective Course – I			
1				1			
2				2			
3				3			
4				4			

**Syllabus Structure for Third Year Engineering (Semester – VI) (Information Technology) (w.e.f. 2020 – 21)**  
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Operating Systems	D	3	-	-	3	40	60	-	-	100	3
Computer Networks	D	3	-	-	3	40	60	-	-	100	3
Software Engineering	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – II	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course – II	F	3	-	-	3	40	60	-	-	100	3
Operating Systems Lab	D	-	-	2	2	-	-	25	25 (PR)	50	1
Computer Networks	D	-	-	2	2	-	-	25	25 (PR)	50	1
Software Engineering Lab	D	-	-	2	2	-	-	25	-	25	1
Minor Project	G	-	-	6	6	-	-	50	25 (OR)	75	3
		15	0	12	27	200	300	125	75	700	21

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

Professional Elective Course – II			Open Elective Course – II		
1			1		
2			2		
3			3		
4			4		

Note: Every student should undergo Summer Internship during Summer Vacation of at least THREE weeks duration. Credits for Summer Internship shall be included in Project (Stage – I) of Semester – VII.

**Syllabus Structure for Fourth Year Engineering (Semester – VII) (Information Technology) (w.e.f. 2021 – 22)**  
(As per AICTE Guidelines)

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Compiler Design	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – III	E	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – IV	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course – III	F	3	-	-	3	40	60	-	-	100	3
Compiler Design Lab	D	-	-	2	2	-	-	25	25 (PR)	50	1
Advanced Technology Lab - I	D	1	-	2	3	-	-	25	25 (OR)	50	2
Project (Stage – I)	G	-	-	12	12	-	-	50	50 (OR)	100	6
Essence of Indian Traditional Knowledge	H	-	-	-	-	-	-	-	-	-	-
		13		16	29	160	240	100	100	600	21

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

Professional Elective Course – III		Professional Elective Course – IV		Open Elective Course – III	
1		1		1	
2		2		2	
3		3		3	
4		4		4	



**Syllabus Structure for Fourth Year Engineering (Semester – VIII) (Information Technology) (w.e.f. 2021 – 22)**  
**(As per AICTE Guidelines)**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Cryptography and Network Security	D	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – V	E	3	-	-	3	40	60	-	-	100	3
Professional Elective Course – VI	E	3	-	-	3	40	60	-	-	100	3
Open Elective Course – IV	F	3	-	-	3	40	60	-	-	100	3
Cryptography and Network Security Lab	D	-	-	2	2	-	-	25	25 (PR)	50	1
Advanced Technology Lab - II	D	2	-	2	4	-	-	25	25 (OR)	50	3
Project	G		-	6	6	-	-	50	50 (OR)	100	3
		14	0	10	24	160	240	100	100	600	19

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

Professional Elective Course – V		Professional Elective Course – VI		Open Elective Course – IV	
1		1		1	
2		2		2	
3		3		3	
4		4		4	

NORTH MAHARASHTRA UNIVERSITY,

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Mechanical Engineering

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**'A' Grade**  
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**(3<sup>rd</sup> Cycle)**

Syllabus Structure

(As per AICTE Guidelines)

w.e.f. 2018 – 19

## Subject Group Code and Subject Groups

Sr. No.	GROUPS	Category	Breakup of Credits (Total 160)	
1	A	Humanities and Social Sciences including Management Courses (HSMC)	12	10
2	B	Basic Science Courses (BSC)	25	26
3	C	Engineering Science Courses including workshop, drawing, basics of electrical/mechanical/computer etc. (ESC)	24	26
4	D	Professional Core Courses (PCC)	48	53
5	E	Professional Elective Courses relevant to chosen specialization/branch (PEC)	18	18
6	F	Open subjects – Electives from other technical and /or emerging subjects (OEC)	18	12
7	G	Project work, seminar and internship in industry or appropriate work place/ academic and research institutions in India/abroad (PROJ)	15	15
8	H	Mandatory Courses (MC) [Environmental Sciences, Induction program, Indian Constitution, Essence of Indian Traditional Knowledge]	(non-credit)	
<b>Total</b>			<b>160</b>	<b>160</b>

**Syllabus Structure for First Year Engineering (Semester – I) (Mechanical, Auto, Civil, Chemical, BioTech) (w.e.f. 2018 – 19) (As per AICTE Guidelines)**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Chemistry	B	3	1	--	4	40	60	--	--	100	4
Mathematics – I	B	3	1	--	4	40	60	--	--	100	4
English	C	3	--	--	3	40	60	--	--	100	3
Engineering Graphics	C	3	--	--	3	40	60	--	--	100	3
Workshop Practices	C	1	--	2	3	--	--	25	25(OR)	50	2
Chemistry Lab	B	--	--	2	2	--	--	25	--	25	1
English Lab	C	--	--	2	2	--	--	25	25(OR)	50	1
Engineering Graphics Lab	C	--	--	2	2	--	--	25	25(OR)	50	1
Induction Program	H	--	--	--	--	--	--	--	--	--	0
		13	2	8	23	160	240	100	75	575	19

\* 3-week long Induction Program for students entering the institution, right at the start.

ISE: Internal Sessional Examination

ESE: End Semester Examination

ICA: Internal Continuous Assessment

**Syllabus Structure for First Year Engineering (Semester – II) (Mechanical, Auto, Civil, Chemical, BioTech) (w.e.f. 2018 – 19) (As per AICTE Guidelines)**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Physics	B	3	1	--	4	40	60	--	--	100	4
Mathematics – II	B	3	1	--	4	40	60	--	--	100	4
Basic Electrical & Electronics Engineering	C	3	1	--	4	40	60	--	--	100	4
Programming for Problem Solving	A	3	--	--	3	40	60	--	--	100	3
Physics Lab	B	--	--	2	2	--	--	25	--	25	1
Basic Electrical & Electronics Engineering Lab	C	--	--	2	2	--	--	25	25(OR)	50	1
Programming for Problem Solving Lab	A	--	--	2	2	--	--	25	25(OR)	50	1
		12	3	6	21	160	240	75	50	525	18

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

**Syllabus Structure for Second Year Engineering (Semester – III) (Mechanical Engineering) (w.e.f. 2019 – 20) (As per AICTE Guidelines)**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Biology	B	3	1	--	4	40	60	-	-	100	4
Engineering Mechanics	C	3	--	--	3	40	60	-	-	100	3
Electrical Drives and Controls	C	3	--	-	3	40	60	--	--	100	3
Thermodynamics	D	3	--	-	3	40	60	--	--	100	3
Industrial Psychology	A	3	--	--	3	40	60	-	-	100	3
Electrical Drives and Controls Lab	C	--	--	2	2	--	--	25	25(OR)	50	1
Thermodynamics Lab	D	--	--	2	2	--	--	25	25(OR)	50	1
Computer Graphics Lab	D	1	--	2	3	-	-	25	25(PR)	50	2
		16	1	6	23	200	300	75	75	650	20

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

**Syllabus Structure for Second Year Engineering (Semester – IV) (Mechanical Engineering) (w.e.f. 2019 – 20) (As per AICTE Guidelines)**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Mathematics – III	B	3	1	--	4	40	60	--	--	100	4
Introduction to Engineering Design Principles	C	3	--	--	4	40	60	--	--	100	3
Applied Thermodynamics	D	3	1	--	3	40	60	--	--	100	4
Fluid Mechanics and Fluid Machines	D	3	--	--	3	40	60	--	--	100	3
Industrial Economics	A	3	--	--	3	40	60	--	--	100	3
Applied Thermodynamics Lab	D	--	--	2	2	--	--	25	25(OR)	50	1
Fluid Mechanics and Fluid Machines Lab	D	--	--	2	2	--	--	25	25(OR)	50	1
Metrology and Quality Control Lab	D	1	--	2	3	-	-	25	25(OR)	50	2
Environmental Science	H	--	--	--	--	--	--	--	--	--	0
		16	2	6	24	200	300	75	75	650	21

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

**Syllabus Structure for Third Year Engineering (Semester – V) (Mechanical Engineering) (w.e.f. 2020 – 21) (As per AICTE Guidelines)**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Heat Transfer	D	3	--	--	3	40	60	--	--	100	3
Manufacturing Processes	D	3	--	--	3	40	60	--	--	100	3
Strength of Materials	D	3	--	--	3	40	60	--	--	100	3
Machine Drawing Lab	D	--	--	2	2	-	-	25	25(OR)	50	1
Heat Transfer Lab	D	--	--	2	2	--	--	25	25(OR)	50	1
Manufacturing Processes Lab	D	--	--	2	2	--	--	25	25(OR)	50	1
Professional Elective Course – I	E	3	--	--	3	40	60	-	-	100	3
Open Elective Course – I	F	3	--	--	3	40	60	-	-	100	3
Minor Project – I (Stage –I)	G	--	--	6	6	-	-	50	-	50	3
MC-III – Constitution of India	H	--	--	--	--	--	--	--	--		0
		15	0	12	27	200	300	125	75	700	21

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

Professional Elective Course – I	Open Elective Course – I



**Syllabus Structure for Third Year Engineering (Semester – VI) (Mechanical Engineering) (w.e.f. 2020 – 21) (As per AICTE Guidelines)**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Kinematics and Theory of Machines	D	3	--	--	3	40	60	--	--	100	3
Manufacturing Technology	D	3	--	--	3	40	60	--	--	100	3
Material Engineering	D	3	--	--	3	40	60	--	--	100	3
Professional Elective Course – II	E	3	--	--	3	40	60	-	-	100	3
Open Elective Course – II	F	3	--	--	3	40	60	-	-	100	3
Kinematics and Theory of Machines Lab	D	--	--	2	2	--	--	25	25(OR)	50	1
Manufacturing Technology Lab	D	--	--	2	2	--	--	25	25()R)	50	1
Material Engineering Lab	D	--	--	2	2	--	--	25	-	25	1
Minor Project	G	--	--	6	6	-	-	50	25(OR)	75	3
		15	--	12	27	200	300	125	75	700	21

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

Professional Elective Course – II	Open Elective Course – II

**NOTE:** Note: Every student should undergo Summer Internship during Summer Vacation of at least THREE weeks duration. Credits for Summer Internship shall be included in Project (Stage – I) of Semester – VII.

**Syllabus Structure for Fourth Year Engineering (Semester – VII) (Mechanical Engineering) (w.e.f. 2021 – 22) (As per AICTE Guidelines)**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Design of Machine Elements & Transmission Systems	D	3	--	--	3	40	60	--	--	100	3
Professional Elective Course – III	E	3	--	--	3	40	60	-	-	100	3
Professional Elective Course – IV	E	3	--	--	3	40	60	-	-	100	3
Open Elective Course – III	F	3	--	--	3	40	60	-	-	100	3
Design of Machine Elements & Transmission Systems Lab	D	--	--	2	2	--	--	25	25(OR)	50	1
Computer Aided Design Lab	D	1	--	2	3	-	-	25	25(OR)	50	2
Project ( Stage – I )	G	--	--	12	12	-	-	50	50(OR)	100	6
Essence of Indian Traditional Knowledge	H	--	--	--	--	--	--	--	--	--	0
		13	--	16	29	160	240	100	100	600	21

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

<b>Professional Elective Course – III</b>	<b>Professional Elective Course – IV</b>	<b>Open Elective Course – III</b>

**Syllabus Structure for Fourth Year Engineering (Semester – VIII) (Mechanical Engineering) (w.e.f. 2021 – 22) (As per AICTE Guidelines)**

Name of the Course	Group	Teaching Scheme				Evaluation Scheme					Credits
						Theory		Practical		Total	
		Theory Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Total	ISE	ESE	ICA	ESE		
Refrigeration and Air Conditioning	D	3	--	--	3	40	60	--	--	100	3
Refrigeration and Air Conditioning Lab	D	--	--	2	2	--	--	25	25(OR)	50	1
Finite Element Analysis & Simulation Techniques Lab	D	2	--	2	4	-	-	25	25(OR)	50	3
Professional Elective Course – V	E	3	--	--	3	40	60	-	-	100	3
Professional Elective Course – VI	E	3	--	--	3	40	60	-	-	100	3
Open Elective Course – IV	F	3	--	--	3	40	60	-	-	100	3
Project	G	--	--	6	6	-	-	50	50(OR)	100	3
		14	--	10	24	160	240	100	100	600	19

**ISE: Internal Sessional Examination**

**ESE: End Semester Examination**

**ICA: Internal Continuous Assessment**

Professional Elective Course – V	Professional Elective Course – VI	Open Elective Course – IV

