

Second Year B. Tech.
Mechanical Engineering
Academic Course Credit System and Evaluation Scheme
REGULATION 2022

NOTES:

- (1) Refer (i) Academic rules and regulations and (ii) Examination rules and regulations for further details.
- (2) Laboratory course is considered as a separate head of passing.
- (3) Assessment criteria for laboratory/Tutorial work. i.e. weightage for assessment shall be as follows: i) Attendance in Laboratory/Tutorial = 20%, (ii) Journal= 40%, (iii) Practical Examination (and/or) Mini project (and/or) Quiz (and/or) Seminar (and/or) Oral (and/or) Industry visit report= 40%.
- (4) Assessment criteria for Internal Evaluation- Lecture and tutorial attendance, punctuality in completing the assigned task, the level of student's involvement during lectures or tutorials sessions, Or, any other observation announced by the course instructor.
- (5) Student can opt for an online course available on <https://swayam.gov.in/> or <https://onlinecourses.nptel.ac.in/> subject to approval from the department. After successful completion of the course, the course title can appear on the grade card of student.
- (6) The Mandatory courses are with Pass (P) and No Pass (NP) grades.
- (7) Department will offer the Value Added courses in a semester subject to availability of resources and enrolment of minimum 20 students opting for the course. Upon completion of the Value Added course, the course title shall appear in the grade card of the student.
- (8) Students can optionally opt for Non-Technical Value Added courses offered by Center for Continuing Education (CCE-SPCE). Upon successful completion of the course, the course title shall appear on student's grade card.

Courses Offered for Second Year B.Tech. in Mechanical Engineering (Semester III) under Regulation-22														
Sr. No.	Course Name	Code	Course Plan per Week (Hrs)			Credits	In semester Evaluation (Points)			End Semester Evaluation (Points)		End semester weightage (%)	Term work/Practical	Total Points
			L	P	T		T-I	T-II	IE	Points	Time (Hrs)			
Core Courses														
1	Applied Mathematics - I	BS-BTM301	3	0	1	4	15	15	10	100	3	60%	50	150
2	Strength of Materials	PC-BTM302	3	0	0	3	15	15	10	100	3	60%	0	100
3	Thermodynamics	PC-BTM305	3	0	1	4	15	15	10	100	3	60%	50	150
4	Manufacturing Science	PC-BTM306	3	0	1	4	15	15	10	100	3	60%	50	150
5	Organizational Communication and Interpersonal Skills	HS-BTM307	2	0	1	3	15	15	10	100	3	60%	50	150
Laboratory Courses														
6	Strength of Materials Laboratory	PC-BTM352	0	2	0	1	0	0	0	0	0	0%	50	50
7	Machine Shop Practice	PC-BTM399	0	2	0	1	0	0	0	0	0	0%	50	50
Mandatory Courses														
8	Indian Traditional Knowledge	MC-BT002	3	0	0	0	15	15	10	100	3	60%	0	100
Online Courses #														
9	Online Course	OL-BTMxxx												
Value Added Courses #														
10	Value Added Tech./Non-Tech.	VA-BTMxxx, VN-BTxxx	Courses offered by CCE											
	TOTAL					20								

IE: Internal Evaluation (Refer Note 4)

#List of courses will be announced at the start of the academic year.

Courses Offered for Second Year B.Tech. in Mechanical Engineering (Semester IV) under Regulation-22														
Sr. No.	Course Name	Code	Course Plan per Week (Hrs)			Credits	In semester Evaluation (Points)			End Semester Evaluation (Points)		End semester weightage (%)	Term work/Practical (Note 2)	Total Points
			L	P	T		T-I	T-II	IE	Points	Time (Hrs)			
Core Courses														
1	Data Analysis and Laplace Transforms	BS-BTM401	3	0	1	4	15	15	10	100	3	60%	50	150
2	Fluid Mechanics	PC-BTM403	3	0	0	3	15	15	10	100	3	60%	0	100
3	Mech. Engineering Measurement	PC-BTM404	3	0	0	3	15	15	10	100	3	60%	0	100
4	Material Science	PC-BTM406	3	0	0	3	15	15	10	100	3	60%	0	100
5	Kinematics of Machinery	PC-BTM412	3	0	1	4	15	15	10	100	3	60%	50	150
Laboratory Courses														
7	Fluid Mechanics Laboratory	PC-BTM453	0	2	0	1	0	0	0	0	0	0	50	50
8	Mechanical Engineering Measurements Laboratory	PC-BTM454	0	2	0	1	0	0	0	0	0	0	50	50
9	Material Science Laboratory	PC-BTM456	0	2	0	1	0	0	0	0	0	0	50	50
10	Assembly Shop Practice	PC-BTM499	0	2	0	1	0	0	0	0	0	0	50	50
Online Courses														
11	#Online course	OL-BTMxxx												
Value Added Courses														
12	#Value Added Tech./Non-Tech.	VA-BTMxxx, VN-BTxxx	Courses offered by CCE											
TOTAL						21								

IE: Internal Evaluation (Refer Note 4)

#List of courses will be announced at the start of the academic year.

Third Year B. Tech.
Mechanical Engineering
Academic Course Credit System and Evaluation Scheme
REGULATION 2022

NOTES:

1. Refer (i) Academic rules and regulations and (ii) Examination rules and regulations for further details
2. Laboratory course is considered as a separate head of passing.
3. Assessment criteria for laboratory/Tutorial work. i.e. weightage for assessment shall be as follows: i) Attendance in Laboratory/Tutorial = 20%, (ii) Journal= 40%, (iii) Practical Examination (and/or) Mini project (and/or) Quiz (and/or) Seminar (and/or) Oral (and/or) Industry visit report=40%.
4. Assessment criteria for Internal Evaluation- Lecture and tutorial attendance, punctuality in completing the assigned task, the level of student's involvement during lectures or tutorials sessions, Or, any other observation announced by the course instructor.
5. Student can opt for an online course available on <https://swayam.gov.in/> or <https://onlinecourses.nptel.ac.in/> subject to approval from the department. After successful completion of the course, the course title can appear on the grade card of student.
6. The Mandatory courses are with Pass (P) and No Pass (NP) grades.
7. Department will offer the Value Added courses in a semester subject to availability of resources and enrolment of minimum 20 students opting for the course. Upon completion of the Value Added course, the course title shall appear in the grade card of the student.
8. Students can optionally opt for Non-Technical Value Added courses offered by Center for Continuing Education (CCE-SPCE). Upon successful completion of the course, the course title shall appear on student's grade card.
9. For Open Elective courses, students with C.P.I. higher than 8.5 can opt for obtaining the credits by completing an online course (approved by department) offered through SWAYAM or NPTEL portal instead of completing elective courses offered by department/institute. Upon successful completion of course, the score given on certificate issued by SWAYAM/NPTEL will be converted to letter grade as per applicable examination regulation.
10. For Project Course: Contact hours =2 and self-learning hours will be as per student's choice; It will have in-semester evaluation which shall include one or more in-semester presentations. (*) 10 points for report and 10 points for presentation and viva voce examined by supervisor and one internal examiner.

Courses Offered for Third Year B.Tech. in Mechanical Engineering (Semester V) under Regulation-22															
Sr. No.	Course Name	Code	Course Plan per Week (Hrs)			Credits	In semester Evaluation (Points)			End Semester Evaluation (Points)		End semester weightage (%)	Term work/Practical (Note 2)	Total Points	
			L	P	T		T-I	T-II	IE	Points	Time (Hrs)				
Core Courses															
1	Heat and Mass Transfer	PC-BTM501	3	0	0	3	15	15	10	100	3	60%	0	100	
2	Mechatronics	PC-BTM503	3	0	0	3	15	15	10	100	3	60%	0	100	
3	Dynamics of Machinery	PC-BTM512	3	0	0	3	15	15	10	100	3	60%	0	100	
4	Thermal and Fluid Machines	PC-BTM514	3	0	0	3	15	15	10	100	3	60%	0	100	
5	Computer Aided Machine Drawing	PC-BTM515	2	0	0	2	15	15	10	100	3	60%	0	100	
Laboratory Courses															
6	Heat and Mass Transfer Lab.	PC-BTM551	0	2	0	1	0	0	0	0	0	0	50	50	
7	Mechatronics Lab.	PC-BTM553	0	2	0	1	0	0	0	0	0	0	50	50	
8	Dynamic of Machinery Lab.	PC-BTM562	0	2	0	1	0	0	0	0	0	0	50	50	
9	Thermal and Fluid Machines Laboratory	PC-BTM564	0	2	0	1	0	0	0	0	0	0	50	50	
10	Computer Aided Machine Drg. Lab.	PC-BTM565	0	2	0	1	0	0	0	0	0	0	50	50	
Professional Elective Course #															
11	Professional Elective Course - I	PE-BTM5xx	3	0	1	4	15	15	10	100	3	60%	50	150	
Mandatory Courses															
12	Health Safety and Environment (HSE)	MC-BTM003	2	0	1	0	15	15	10	100	3	60%	25	125	
Online Courses #															
13	Online Course	OL-BTMxxx													
Value Added Courses #															
14	Value Added Tech./Non-Tech.	VA-BTMxxx, VN-BTxxx	Courses offered by CCE												
TOTAL						23									

IE: Internal Evaluation (Refer Note 4)

#List of course will be announced at the start of academic year.

Courses Offered for Third Year B.Tech. in Mechanical Engineering (Semester VI) under Regulation-22															
Sr. No.	Course Name	Code	Course Plan per Week (Hrs)			Credits	In semester Evaluation (Points)			End Semester Evaluation (Points)		End semester weightage (%)	Term work/Practical	Total Points	
			L	P	T		T-I	T-II	IE	Points	Time (Hrs)				(Note 2)
Core Courses															
1	Manufacturing Planning and Control	PC-BTM605	3	0	1	4	15	15	10	100	3	60%	50	150	
2	CAD/CAM/CIM	PC-BTM606	2	0	0	2	15	15	10	100	3	60%	0	100	
3	Refrigeration and Air-conditioning	PC-BTM611	2	0	0	2	15	15	10	100	3	60%	0	100	
4	Machine Design	PC-BTM612	3	0	1	4	15	15	10	100	3	60%	50	150	
5	Energy Engineering	PC-BTM614	3	0	1	4	15	15	10	100	3	60%	50	150	
Laboratory Courses															
6	CAD/CAM/CIM Laboratory	PC-BTM656	0	2	0	1	0	0	0	0	0	0	50	50	
7	Refrigeration and Air-cond. Laboratory	PC-BTM661	0	2	0	1	0	0	0	0	0	0	50	50	
Professional Elective Course#															
8	Professional Elective Course - II	PE-BTM6xx	3	0	1	4	15	15	10	100	3	60%	50	150	
Open Elective Course#															
9	Open Elective -I	OE-BTx6xx	2	0	1	3	15	15	10	100	3	60%	50	150	
Project Course															
10	Project Stage I	PR-BTM698	2			1	One or more In-semester presentations					50	50		
Mandatory Skill Based Courses #															
11	Skill Based Course	SK-BTM6xx	0	2	0	0	0	0	0	0	0	0	50	50	
Online Courses#															
12	Online Course	OL-BTMxxx													
Value Added Courses															
13	#Value Added Tech./Non-Tech.	VA-BTMxxx, VN-BTxxx	Courses offered by CCE												
TOTAL						26									

IE: Internal Evaluation (Refer Note 4)

#List of courses will be announced at the start of the academic year.

Final Year B. Tech.
Mechanical Engineering
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REGULATION 2022

NOTES:

1. Refer (i) Academic rules and regulations and (ii) Examination rules and regulations for further details.
2. Laboratory course is considered as a separate head of passing.
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6. Department will offer the Value Added courses in a semester subject to availability of resources and enrolment of minimum 20 students opting for the course. Upon completion of the Value Added course, the course title shall appear in the grade card of the student.
7. Students can optionally opt for Non-Technical Value Added courses offered by Center for Continuing Education (CCE-SPCE). Upon successful completion of the course, the course title shall appear on student's grade card.
8. The contents of core courses are aligned with the latest GATE syllabus. The mapping between GATE syllabus topics and core courses is given in Table GATE-MAP.
9. For Open Elective courses, students with C.P.I. higher than 8.5 can opt for obtaining the credits by completing a online course (approved by department) offered through SWAYAM or NPTEL portal instead of completing elective courses offered by department/institute. Upon successful completion of course, the score given on certificate issued by SWAYAM/NPTEL will be converted to letter grade as per applicable examination regulation.
10. For Project Course: Contact hours = 2 and self-learning hours (\$) = 6; It will have in-semester evaluation which shall include one or more in-semester presentations. (*) 10 points for report and 10 points for presentation and viva voce examined by supervisor and one internal examiner.
11. For Internship: Refer Academic book for details.

Courses Offered for Final Year B.Tech. in Mechanical Engineering (Semester VII) under Regulation-22

Sr. No.	Course Name	Code	Course Plan per Week (Hrs)			Credits	In semester Evaluation (Points)			End Semester Evaluation (Points)		End semester weightage (%)	Term work/Practical	Total Points	
			L	P	T		T-I	T-II	IE	Points	Time (Hrs)				
Core Courses															
1	Design of Machines and Mechanical Systems	PC-BTM711	3	0	1	4	15	15	10	100	3	60%	50	150	
2	Industrial Engineering and Project Management	PC-BTM714	3	0	1	4	15	15	10	100	3	60%	50	150	
Professional Elective Course #															
3	Professional Elective - III	PE-BTM7xx	3	0	1	4	15	15	10	100	3	60%	50	150	
4	Professional Elective - IV	PE-BTM7xx	3	0	1	4	15	15	10	100	3	60%	50	150	
Open Elective Course #															
5	Open Elective - II	OE-BTM7xx	2	0	1	3	15	15	10	100	3	60%	50	150	
Project Course															
6	Project Stage II	PR-BTM798	2 + 6\$			4	One or more In-semester presentations					100	100		
Online Courses #															
7	Online Course	OL-BTMxxx													
Value Added Courses #															
8	Value Added Tech./Non-Tech.	VA-BTMxxx, VN-BTxxx	Courses offered by CCE												
TOTAL						23									

IE: Internal Evaluation (Refer Note 4)

#List of course will be announced at the start of academic year.

Courses Offered for Final Year B.Tech. in Mechanical Engineering (Semester VIII) under <i>Regulation-22</i>													
Sr. No.	Course Name	Code	Course Plan per Week (Hrs)			Credits	In semester Evaluation (Points)		End Semester Evaluation (Points)		End semester weightage (%)	Term work/Practical	Total Points
			L	P	T		T-I	T-II	Points	Time (Hrs)			
Open Elective Course													
1	Open Elective -III	PR-BTM8xx	SWAYAM / NPTL Course of 12 weeks			3			-	-	-	100	100
Internship													
2	External / Internal Internship	PR-BTM8xx				9	Refer institute's academic book for details					200	200
	TOTAL					12							

Sardar Patel College of Engineering

TABLE PEC-TYBTECH: Professional Elective Courses - I and II for Third Year B.Tech. in Mechanical Engineering (Semester V and VI)

Sr. No.	Course Name	Specialization	Code	Course Plan per Week(Hrs)			Credits	In semester Evaluation(Points)			End Semester Evaluation (Points)		End semester weightage (%)	Term work/Practical	Total Points
				L	P	T		T-I	T-II	IE	Points	Time (Hrs)			
Professional Elective Courses I and II															
1	Finite Element Methods for Mech. Engineers	D	PE-BTM511	3	2	0	4	15	15	10	100	3	60%	50	150
2	Mechanical Vibrations	D	PE-BTM518	3	0	1	4	15	15	10	100	3	60%	50	150
3	Solid Mechanics	D	PE-BTM519	3	0	1	4	15	15	10	100	3	60%	50	150
4	Composite Material Technology	M	PE-BTM532	3	0	1	4	15	15	10	100	3	60%	50	150
5	Lean and Green Manufacturing	M	PE-BTM534	3	0	1	4	15	15	10	100	3	60%	50	150
6	Tool Engineering	M	PE-BTM537	3	0	1	4	15	15	10	100	3	60%	50	150
7	Industrial Mgmt. and Entrepreneurship	M	PE-BTM538	3	0	1	4	15	15	10	100	3	60%	50	150
8	Additive Manufacturing	M	PE-BTM539	3	0	1	4	15	15	10	100	3	60%	50	150
9	Hydraulic Machinery	T	PE-BTM552	3	2	0	4	15	15	10	100	3	60%	50	150
10	Compressible Fluid Flow	T	PE-BTM554	3	0	1	4	15	15	10	100	3	60%	50	150

Note: Specializations are: D - Design, M - Manufacturing, T - Thermal Engineering

Sardar Patel College of Engineering
TABLE OEC-TYBTECH: Open Elective Courses -I offered by the Mechanical Engineering Department for
Third Year B.Tech. in Mechanical Engineering (Semester VI)

Sr. No.	Course Name	Code	Course Plan per Week (Hrs)			Credits	In semester Evaluation (Points)			End Semester Evaluation (Points)		End semester weightage (%)	Term work/P ractical	Total Points
			L	P	T		T-I	T-II	IE	Points	Time (Hrs)			
Open Elective Courses - I														
1	Computational Methods	OE-BTM611	2	0	1	3	15	15	10	100	3	60%	50	150
2	Entrepreneurship Development and Start-up	OE-BTM613	2	0	1	3	15	15	10	100	3	60%	50	150
3	Introduction to Optimization Methods	OE-BTM614	2	0	1	3	15	15	10	100	3	60%	50	150
4	Industry 4.0	OE-BTM616	2	0	1	3	15	15	10	100	3	60%	50	150
5.	Smart City for Sustainable Development	OE-BTM618	2	0	1	3	15	15	10	100	3	60%	50	150
5	Online Course from SWAYAM/NPTEL	OE-BTS6Mx	0	0	0	3	0	0		100	0	100%	0	100

Additional OEC available: Refer to open elective courses offered by the Civil and Electrical Engineering Department of SPCE

Sardar Patel College of Engineering
TABLE: Professional Elective Courses – III and IV for Final Year B.Tech. in Mechanical Engineering (Semester VII)

Sr. No.	Course Name	Specialization	Code	Course Plan per Week (Hrs)			Credits	In semester Evaluation (Points)			End Semester Evaluation (Points)		End semester weightage (%)	Term work/Practical (Note 2)	Total Points
				L	P	T		T-I	T-II	IE	Points	Time (Hrs)			
Professional Elective Courses III and IV															
1	Process Eqpt. Design and Piping Engg.	D	PE-BTM711	3	0	1	4	15	15	10	100	3	60%	50	150
2	Fatigue, Fracture and Failure Analysis	D	PE-BTM718	3	0	1	4	15	15	10	100	3	60%	50	150
3	Industrial Robotics	M	PE-BTM733	3	0	1	4	15	15	10	100	3	60%	50	150
4	Supply Chain Management	M	PE-BTM734	3	0	1	4	15	15	10	100	3	60%	50	150
5	Welding Process and Welding Technology	M	PE-BTM735	3	0	1	4	15	15	10	100	3	60%	50	150
6	Computational Fluid Dynamics	T	PE-BTM752	3	0	1	4	15	15	10	100	3	60%	50	150
7	Introduction to Cryogenics	T	PE-BTM753	3	0	1	4	15	15	10	100	3	60%	50	150
8	Power Plant Engineering	T	PE-BTM754	3	0	1	4	15	15	10	100	3	60%	50	150
9	Automobile Engineering	T	PE-BTM755	3	0	1	4	15	15	10	100	3	60%	50	150
10	Renewable Energy Sources and Utilization	T	PE-BTM756	3	0	1	4	15	15	10	100	3	60%	50	150

Note: Specializations are: D - Design, M - Manufacturing, T - Thermal Engineering

Sardar Patel College of Engineering
TABLE: Open Elective Courses - II and III for Final Year B.Tech. in Mechanical Engineering (Semester VII and VIII)

Sr. No.	Course Name	Code	Course Plan per Week (Hrs)			Credits	In semester Evaluation (Points)			End Semester Evaluation (Points)		End semester weightage (%)	Term work/Practical	Total Points
			L	P	T		T-I	T-II	IE	Points	Time (Hrs)			
Open Elective Courses - II and III														
1	Introduction to Research Methodology	OE-BTM712	2	0	1	3	15	15	10	100	3	60%	50	150
2	Introduction to MEMS	OE-BTM714	2	0	1	3	15	15	10	100	3	60%	50	150
3	Solar and Wind Technology	OE-BTM715	2	0	1	3	15	15	10	100	3	60%	50	150
4	Digital Twin	OE-BTM617	2	0	1	3	15	15	10	100	3	60%	50	150
5	Fundamentals of AI and Machine Learning	OE-BTM718	2	0	1	3	15	15	10	100	3	60%	50	150
6	Value Engineering	OE-BTM719	2	0	1	3	15	15	10	100	3	60%	50	150
7	Generative Design	OE-BTM721	2	0	1	3	15	15	10	100	3	60%	50	150
8	Big Data Analytics	OE-BTM891	2	0	1	3	15	15	10	100	3	60%	50	150
9	Introduction to Augmented Reality	OE-BTM717	2	0	1	3	15	15	10	100	3	60%	50	150
10	Online Course from SWAYAM/NPTEL Refer TABLE SWAYAM / NPTEL	OE-BTS7Mx	0	0	0	3	0	0		100	0	100%	0	100

Additional OEC available: Refer open elective courses offered by the Civil and Electrical Engineering Department of SPCE

**Table GATE-MAP: Alignment of Course Content with GATE Syllabus
B.Tech. in Mechanical Engineering**

No.	Section	Core courses in SPCE Curriculum 2023-24	Topics From GATE Syllabus
1	D	Machine Design	Machine Design
2	D	Design of Machines and Mech. Systems	Machine Design
3	D	Kinematics of Machinery	Theory of Machines
4	D	Dynamics of Machinery	Theory of Machines, Vibrations
6	D	Strength of Materials	Mechanics of Materials
7	D	Computer Aided Machine Drawing	Machine Design
8	M	CAD/CAM/CIM	Computer Integrated Manufacturing
9	M	Mechanical Engineering Measurements	Metrology and Inspection
10	M	Manufacturing Science	Casting, Forming and Joining Processes; Machining and machine tool operations
11	M	Manufacturing Planning and Control	Production Planning and Control, Inventory Control, Operations Research
12	M	Mechatronics	Computer Integrated Manufacturing
13	M	Ind. Engg. And Proj./Fin. Mgmt.	Production Planning and Control, Operations Research
14	M	Material Science	Engineering materials
15	T	Thermal Systems	Applications of Fluid mechanics and Thermal sciences
16	T	Fluid Mechanics	Fluid Mechanics
17	T	Heat and Mass Transfer	Heat-Transfer
18	T	Refrigeration and Air-conditioning	Applications of Fluid mechanics and Thermal sciences
19	T	Thermodynamics	Thermodynamics
20	T	Energy Engineering	Applications of Fluid mechanics and Thermal sciences
21	MATH	Applied Mathematics,	Linear Algebra, Calculus, Differential Equations, Complex variables, Probability and Statistics, Numerical Methods

Note: Sections are: D - Applied Mechanics and Design, M -Materials, Manufacturing and Industrial Engineering, T - Fluid Mechanics and Thermal Sciences, MATH - Engineering Mathematics

Sardar Patel College of Engineering
TABLE: Online Courses (12 Week) offered by SWAYAM or NPTL Portal for OE-II, III

Sr. No.	Course Name	Coordinating Institute	Proposed Faculty Coordinator
1	Heat Exchangers: Fundamentals And Design Analysis	IITG	RSM
2	Finite Element Method: Variational Methods to Computer Programming	IITK	NRR
3	Computational Continuum Mechanics	IITM	RBB
4	Metal Additive Manufacturing	IITG	RBB
5	Numerical Methods for Engineers	IITG	HSM
6	Solar Energy Engineering and Technology	IITK	KSB
7	Heat Exchangers: Fundamentals And Design Analysis	IITM	NRR/DNJ
8	Finite Element Method: Variational Methods to Computer Programming	IITG	SRV
9	Computational Continuum Mechanics	IITG	RSM
10	Metal Additive Manufacturing	IITK	KSB
11	Numerical Methods for Engineers	IITM	RSM
12	Solar Energy Engineering and Technology	IITG	BNB
13	Heat Exchangers: Fundamentals And Design Analysis	IITG	RSM
14	Finite Element Method: Variational Methods to Computer Programming	IITK	DNJ/NRR
15	Computational Continuum Mechanics	IITM	DNJ/NRR
16	Metal Additive Manufacturing	IITG	KSB
17	Numerical Methods for Engineers	IITG	RSM
18	Solar Energy Engineering and Technology	IITK	RSM

NOTE: Students should explore for details of the course.

Course enrollment dates are generally in the month of July-August and December-Jan