Perspective Plan
2017-2021

Dr. Babasaheb Ambedkar Technological University

Lonere, Raigad (M.S.)

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY

[STATE TECHNICAL UNIVERSITY BY MAHARASHTRA ACT NO. XXIX OF 2014]

As per Sections 3(3) and 4(1) of Chapter II of the

Dr. Babasaheb Ambedkar Technological University Act, 2014,

the ***University is an affiliating University***

and the territorial limits, within which the powers conferred upon the University by this Act,

shall comprise of the ***whole of Maharashtra***

and it may affiliate any college, or institution conducting engineering, pharmacy, architecture, hotel management and catering technology courses

for the conferment

of degrees, diplomas or grant certificates

to the students admitted therein.

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Section 1: Vision & Mission

VISION

The University is committed to becoming a leading 'Center of Excellence' in the field of Engineering & Technology, Pharmacy, Architecture, Hotel Management and Catering Technology and Allied Sciences with a national character and international outlook

MISSION

Transforming technical education and promoting research & innovation

Section 2: Core Values

As the State Technical University we aim to work most effectively when motivated by the common values- Openness, Commitment, Integrity, Innovation and Societal relevance

Openness

The University is open to all and the inclusiveness embraces diversity, respecting the perspectives and contributions of all, students, faculty, staff, industry and society.

Commitment

Every individual in the University shall remain committed to the University's vision, mission, values and quality education policy

Integrity

We agree to be consistently honest and fair in our dealings with others, respect each other's interests and abilities to work together towards a common goal of achieving excellence and stay rooted in integrity

Innovation

We aim to make Innovation the way of life at the University, espouse the academic rigour and work together to design products, processes and systems for economic prosperity.

Societal relevance

We continually strive to be better by applying creative solutions to problems in rapidly changing technology landscape. We commit to respond to the needs of colleagues, students, research sponsors, industries and visitors in a helpful, timely and sensitive manner.

Executive Summary

Dr. Babasaheb Ambedkar Technological University has been designated as an Affiliating Technical University (ATU) of the state from 2nd March 2016 and within six month's time the university has set up the process of affiliation rolling for Engineering (Engg.), Pharmacy (Pharm.) , Architecture (Arch.) and Hotel Management and Catering Technology (HMCT) Colleges in the State.

Having one university to look into all technology courses is a belated but welcome step taken by the state government. In all other states, the ATU's have been established long time ago with mandate to all professional colleges compulsorily joining them in one go. In the state of Maharashtra, the affiliation has been made optional and thus affiliation shall take place in phases.

With major academic bodies, such as Executive Council (EC), Academic Council (AC), Boards of Studies (BoS) and Planning, Monitoring and Evaluation Board (PMEB) in place, the university has now started functioning with limited resources at its disposal.

The PM&E Board of the university has started planning various activities of the University. The board has taken the recommendations of the Dr. Narendra Jadhav committee for higher education based on the reports of committees led by Dr. Kakodkar, Dr. Nigvekar and Dr. Takwale as a base to prepare the perspective plan of the university. The reports from All India Council of Technical Education (AICTE), Ministry of Human Resource Development, Ministry of Skill Development, and several reports of industries and CII also formed the resource base of this plan.

The point wise recommendations of the Dr. Narendra Jadhav committee have been taken into consideration in the perspective plan for the next five years but in few sections the development shall be spread over a decade or even longer period.

A summary of the recommendation of the perspective plan is as follows:

Table 1: Summary of Recommendations & Plans

Sr. No.	Key Focus Area	Recommendation / Plan
1.	**Administrative and Organizational Structure**	• An efficient and lean Organizational setup at the Main Campus and Regional Centres and Sub-Centres has been designed • Year-wise plan for Creation and Filling of positions of academic and administrative personnel required for the efficient functioning of the university's main campus and regional centers/sub-centers • Establishing well defined Roles and responsibilities of the University officers and other bodies • Establishing paperless e-Office for efficient, responsive and accountable administration
2.	**Affiliation**	• Plan for Step-wise affiliation to bring all professional colleges, except Management, under the State Technical University in five years
3.	**Graduate Enrollment Ratio**	• The current GER of the State is 29.9. District-wise Planning of additional colleges in Engineering & Technology, Pharmacy,

Sr. No.	Key Focus Area	Recommendation / Plan
	improvement	Architecture and HMCT, population growth, analysis of the HSC results in last five years and goal of achieving GER of 35, has been included.
4.	**Academic Development & Academic Reforms**	• The Academic Reforms include Curriculum Development and Dynamic Syllabi to meet needs of aspiring candidates and that of Society and industry, Revised curriculum, Academic Autonomy, Choice Based Credit System, Electives from IInd year, Mandatory Industrial Training after the third year, Industrial and/or Society's need based projects in final year, Hands-on-training, Project based learning, Self-paced learning
5.	**Quality Improvement**	• Academic audit of University Departments and Affiliated colleges, • NBA/ NAAC accreditation for all affiliated colleges, • Online Monitoring academic activities of the colleges, • Development of academic facilities, Evaluation of Teaching-Learning processes, • Feedback from all stake-holders, • Training of Teachers in emerging areas
6.	**Exams & Assessments**	• Timely conduct of examinations across the entire State, • Continuous Assessment for all Courses, • On-line Remedial examination within four weeks of declaration of results, • Digital Evaluation of Answer-books, • Online transmission of question papers, Question banks, faster revaluations
7.	**Research & Development, Innovation**	• Development of PG Centres and Centres of Excellence in specified areas, • Advanced Research facilities, Maker's Labs at Main campus and at Regional Centres, • IPR cells, Incubation centres, • Capacity building of faculty in specified areas like, Chemical process safety, Bridge monitoring system, e-attendance, website security, data analytics, big data analytics, machine learning, smart sensors, artificial intelligence, machine learning, deep learning, cyber security, etc.
8.	**Industry Relations**	• Industry Internships for students and Faculty,

Sr. No.	Key Focus Area	Recommendation / Plan
		• Staff Development, • Joint Technology and Product Developments, Technology Transfer, • Training of Industry Personnel,
9.	**Curriculum Development & Teacher Training Center**	• Setting up a training Centre for training faculty and staff in Pedagogy, Capacity building, • Industrial and Corporate exposure, • Technology Development, Entrepreneurship, Consultancy • E-content generation
10.	**Stakeholder Engagement**	• Developing formal system for getting Feedback from students, faculty, staff, alumni, parents, industry. • Data analysis and incorporation in curriculum development and Teaching-Learning processes
11.	**Information & Communications**	• Development of State-wide University Information Management System, • Building ICT infrastructure of High Speed computers, Data management System, • Online resources and e-services to all Stake holders, • Online admissions, registrations, affiliations and conducting examinations, • e-Office for paperless administration
12.	**Infrastructure Developments**	• Building Regional centre buildings, Building PG Centres and Centres of Excellence at main campus, • Additional Hostels and heavy machinery laboratories, Workshops, and Maker's Laboratories, • Building Centre for Teacher's Training, and faculty guest house, • Solar power generation, • Water purification plants and Waste Disposal plants, • Shopping complex, School and Medical facilities for residents, Sports Complex and recreational facilities
13.	**Skill Development**	• Development of skills in graduates in specified areas, • Training of uneducated youth and local population.
14.	**Alumni Relations**	• Networking with past students, developing local chapters
15.	**Regional Centers**	• Establishing Centre and sub-centre buildings, • Recruiting efficient staff to maintain lean organizational structure,

Sr. No.	Key Focus Area	Recommendation / Plan
		• Establishing inter-Centre communication Centre, • Developing relations between local industry and colleges, • Building Innovation and Incubation Centres, • Training of faculty in affiliated colleges, • Developing industry relations, mapping of needs of local industries
16	**Societal Relevance**	• MoU with Tribal Development Department of GoM, • Identification of local problems through NSS teams of University and affiliated colleges
17	**Planning, Monitoring & Evaluation**	• Program and Developmental project planning, Resource allocation, monitoring affiliation process and quality of affiliated colleges.

Administrative Setup

1. Administrative Setup of the New State Affiliating Technical University

The university shall be governed by the main centre at Lonere, Dist. Raigad, while the four regional centres at Aurangabad, Mumbai, Nagpur and Pune and five sub-centres at Amravati, Jalgaon, Kolhapur, Nanded and Solapur, shall be established for decentralized operations of the university. Each centre will be headed by a Director/Jt. Director and shall be developed as an autonomous centre to look after the colleges within its region of management.

A 'Regional Center' means a Center established or maintained by the University, as its constituent unit, for the purpose of coordinating and supervising the work of students and institutions and for rendering any other assistance including training, conducting classes and administering examinations and for performing such other functions as may be conferred on such center by the Executive Council (EC).

The organizational structures and plan for filling the statutory positions over a period of five years is specified in Section 1.1 below. The roles, responsibilities and powers have been specified for each position.

With the new status of Affiliating Technical University, the University requires critical manpower. The proposed plan includes appointments of faculty members in University Departments meeting the requirements of regulatory bodies like AICTE, NBA and NAAC, induction of Deans at the Main Centre, creating and filling University Officers on Statutory positions of Directors at main centre, Regional Centres and Sub-centers.

The new offices shall also require supporting staff, whose numbers have been enumerated and planned over a period of five years with expansion of the University covering all 370 Engineering colleges, 179 Pharmacy colleges, 80+ Architecture colleges and 40+ HMCT colleges. For efficient organization, their deployment in early phase of the development of the University is a must.

Currently, the University is heavily understaffed. The required number of faculty members to run all the current courses as per the AICTE norms is 176. However, only 94 positions of faculty members have been sanctioned by the Government and only 56 faculty members have been recruited. The situation is similar at non-teaching staff level. It is a matter of utmost importance to fill all the vacant positions with the highest priority. The University has been following with concerned officers in the Government to fill up all the vacant positions. The University, however, has been functioning with ad-hoc faculty and non-teaching staff.

1.1. Organizational Structures

For efficient functioning of the various departments key positions and the organization structure of each department is illustrated in the following sections.

1.1.1. Main University Campus

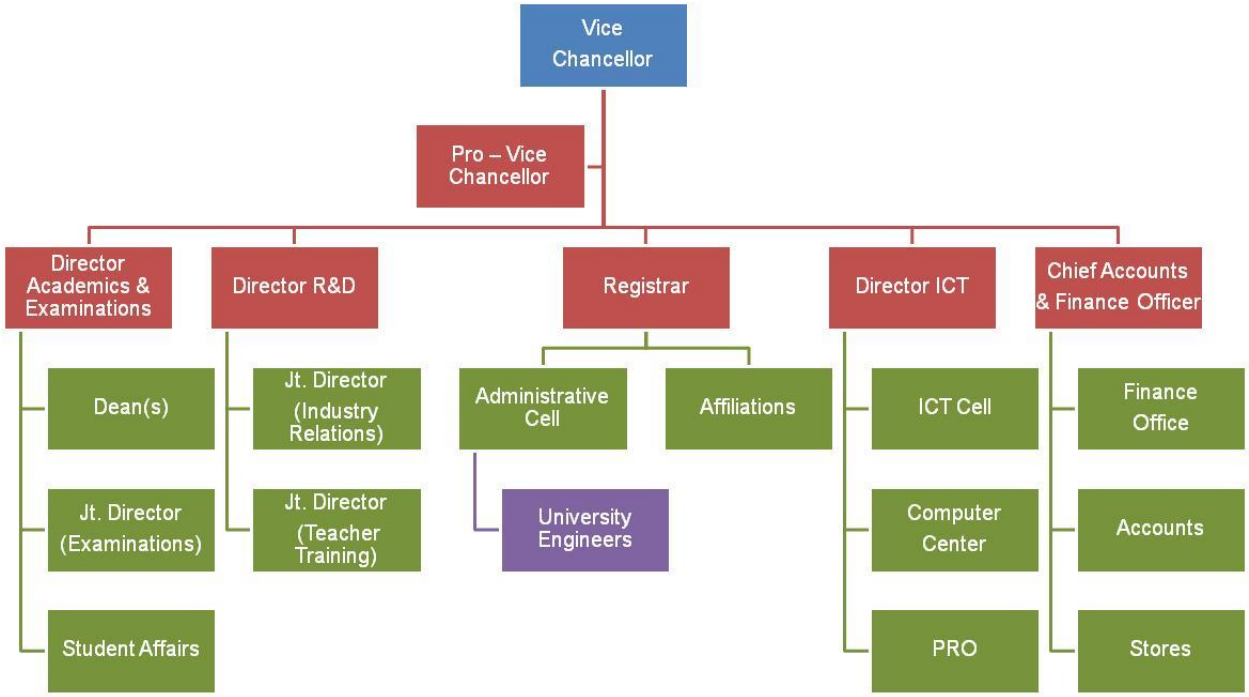


Figure 1.1.1 – Organization Structure at Main Campus

1.1.2. At Regional Centres (4)

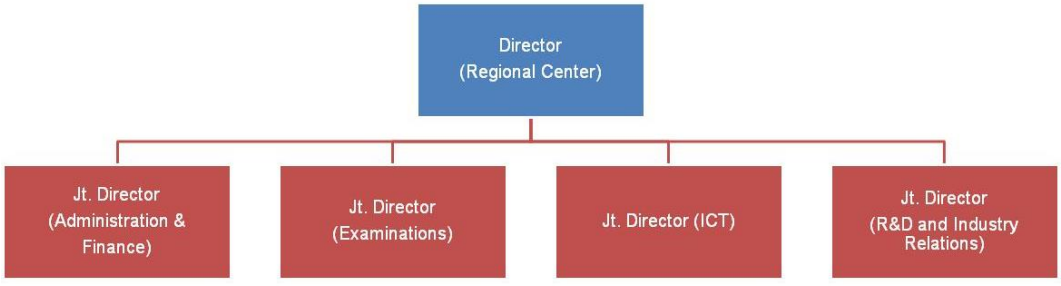


Figure 1.1.2 – Organization Structure at Regional Centres

1.1.3. At Regional Sub-Centres (5 Nos.)

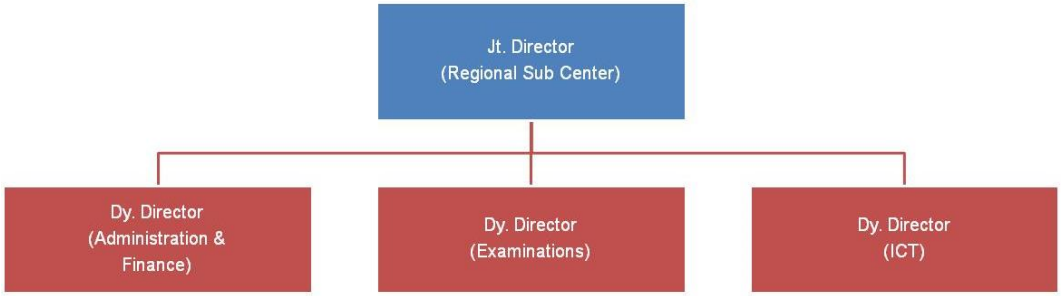


Figure 1.1.3– Organization Structure at Regional Sub-Centres

1.1.4. Administration Department at Main University Campus

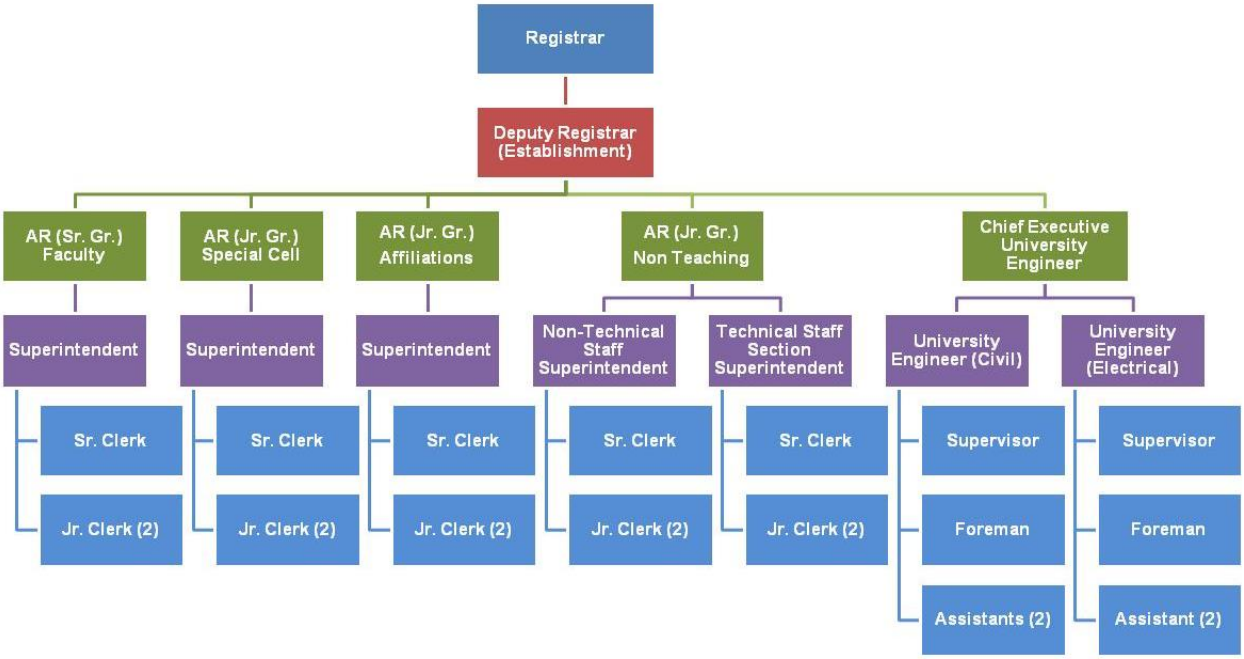


Figure 1.1.4 – Organization Structure of Administration Department at Main Campus

1.1.5. Finance Section

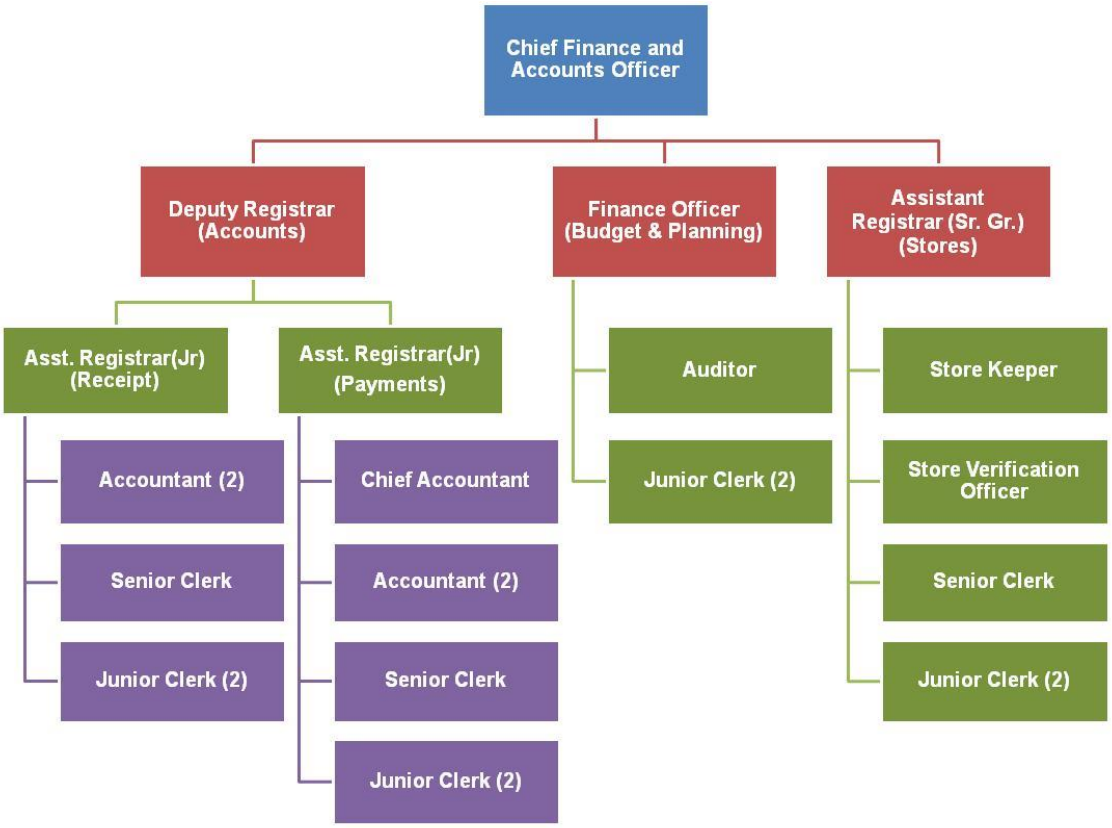


Figure 1.1.5 – Organization Structure of Finance Department at Main Campus

1.1.6. ICT Human Resources and Infrastructure at the University

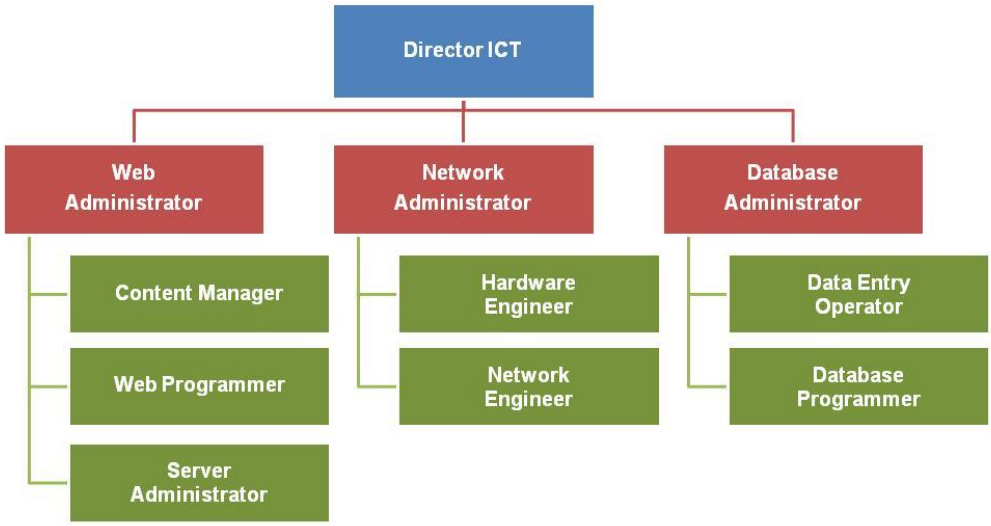


Figure 1.1.6 – Organization Structure of ICT Department at Main Campus

1.1.7. ICT Human Resources and Infrastructure at the Centres

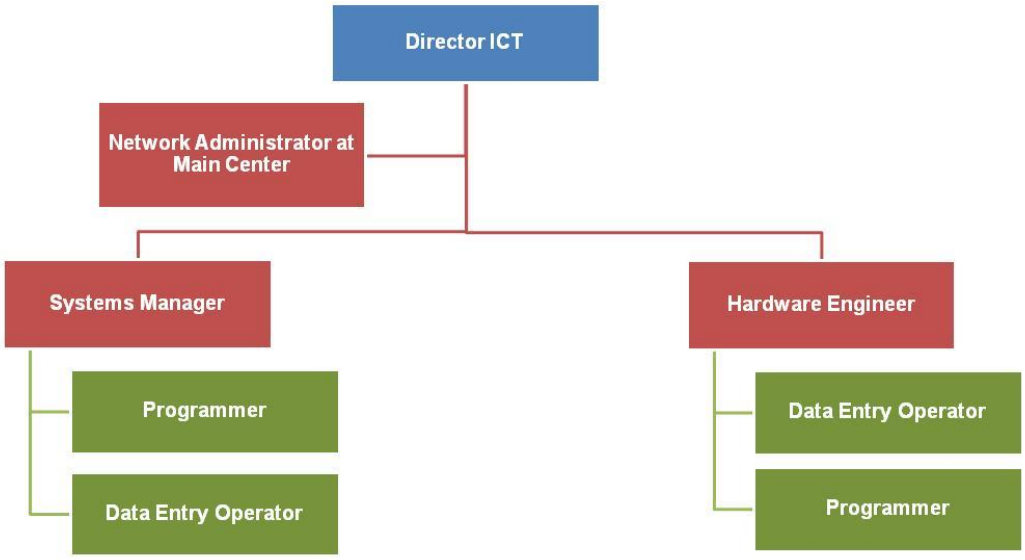


Figure 1.1.7 – Organization Structure of ICT Department at Main Campus

1.2. Administration of the University

The most critical positions for the University are listed below in the Table.

Table 1.2: List of Key University Positions

Sr. No	Position	Function	No. Of Positions
1	The Chancellor	Hon'ble Governor, State of Maharashtra	1
2	Vice-Chancellor	Appointed by the State Government	1
3	Registrar	Appointed by the State Government	1
4	Directors	Director – Academics & Examination	1
		Director - R&D and Industry Relations	1
		Director - Information and Communication Technology	1
		Directors - Regional Centres (Nos.4)	4
5	Deans of Faculties	Dean - Engineering & Technology	1
		Dean - Pharmacy	1
		Dean - Architecture	1
		Dean - Hotel Management & Catering Technology	1
6	Dean of Research and Development	Dean - R&D	1
7	Finance Officer	First Finance Officer is yet to be appointed by the State Government	1
8	Joint Director at Main Campus	Jt. Director - Examination	1
		Jt. Director - Industry	1

Sr. No	Position	Function	No. Of Positions
		Jt. Director- Curriculum Development & Teachers' Training Centre	1
9	Jt. Directors at Regional Centres	Jt. Director - Administration & Finance(No.4) Jt. Director - Examination(No.4) Jt. Director - R&D and Industry Relations(No.4) Jt. Director - ICT(No.4)	16 (4 for each position)
10	Jt. Director-	Jt. Director - Regional Sub-Centres(05)	5
11	Deputy Directors at Regional Sub-Centres	Dy. Director - Administration & Finance(No.5) Dy. Director - Examination(No.5) Dy. Director - ICT(No.5)	15 (5 for each position)
12	Librarian	Librarian	1
13	Other Officers in the University to be newly created	Pro-Vice Chancellor	1
		Chief Accounts and Finance Officer	1
		Dean- Student, Staff Welfare and Alumni Relations	1
		Dean- National and International Relations	1
		Dean- Innovation & Incubation Centre	1
		Chief Executive Engineer	1
		University Engineers (Civil & Electrical)	2

1.3. Planning of Filling the Positions and Managing Human Resources at the Main Campus

The tables below detail out the various human resources required by every department/ section. (**Green** indicates already filled position; **Yellow** Indicates Plan of filling the position **over the next four years)**

1.3.1. Executive Office Bearers:

Sr. No	Position	Staff	No.	Year of Hiring			
				'17-'18	'18-'19	'19-'20	'20-'21
1	**Vice-Chancellor**		1	1			
	Vice-Chancellor's Secretariat	Executive Assistant	1		1		
		PA to Vice-Chancellor	1	1			
		Clerk cum data entry operator	1			1	
2	**Pro-Vice-Chancellor**		1			1	
	Pro-Vice-Chancellor's Secretariat	PA to pro-Vice-Chancellor	1			1	
		Clerk cum data entry operators	2			2	
3	**Director-Academic**		1	1			
	Director's office (Academic)	PA to Director	1	1			
		Clerk cum data entry operator	2		2		
4	**Director-Administration**		1	1			
	Director's office (Administration)	PA to Director	1	1			
		Clerk cum data entry operator	2		2		

1.3.2. Research & Development:

Sr. No	Position	Staff	No.	'17-'18	'18-'19	'19-'20	'20-'21
5	**Director-R&D**		1	1			

Sr. No	Position	Staff	No.	'17-'18	'18-'19	'19-'20	'20-'21
	Director's office *(R&D)*	PA to Director	1	1			
		Clerk cum data entry operator	2		1	1	
5.1	**Jr. Director- Industry Relations**		1		1		
	Office of Jt. Director-Industry Relations	Sr. Clerk	1		1		
		Jr. Clerk cum data entry operator	2		1	1	
5.2	**Jr. Director-Curriculum Development & Teacher's Training**		1		1		
	Office of Jt. Director-Curriculum development & Teachers' Training Centre	Sr. Clerk	1		1		
		Jr. Clerk cum data entry operator	2		2		

1.3.3. Directorate of Information & Communication Technology

Sr. No	Position	Staff	No.	'17-'18	'18-'19	'19-'20	'20-'21
6.0	**Director-ICT Systems**		1	1			
	Director's office- ICT	PA to Director	1	1			
		PRO	1	1			
		Jr. Clerk cum Data Entry Operator	6	2	2	1	1
		System Manager	1		1		
		System Analyst	1		1		
		Computer Programmer	4		2	1	1
6.1	**Computer Centre**	System Manager	1	1			
		Computer Maintenance staff	4		2	1	1

1.3.4. Board of Deans:

Sr. No	Position	Staff	No.	'17-'18	'18-'19	'19-'20	'20-'21
7.1	**Dean-E&T**		1	1			
	Associate Dean- E&T		1		1		
	Dean's office	PA to Dean	1	1			
		Clerk cum data entry operator	2	1		1	
7.2	**Dean-Pharmacy**		1	1			
	Associate Dean-Pharmacy		1		1		
	Dean's office	PA to Dean	1	1			
		Clerk cum data entry operator	2	1		1	
7.3	**Dean-Architecture & HMCT**		1	1			
	Associate Dean		1		1		
	Dean's office	PA to Dean	1	1			
		Clerk cum data entry operator	2	1		1	
7.4	**Dean-Student, Staff Welfare & Alumni Relations**		1	1			
	Associate Deans		3		1	1	1
	Training and Placement Officer		1	1			
	Dean's office	PA to Dean	1	1			

Sr. No	Position	Staff	No.	'17-'18	'18-'19	'19-'20	'20-'21
		Clerk cum data entry operator	2	1		1	
7.5	**Dean-R&D (PG, PhD, Research Projects)**		1	1			
	Associate Deans		3		1	1	1
	Dean's office	PA to Dean	1	1			
		Clerk cum data entry operator	2	1		1	
7.6	**Dean-Innovation and Incubation Centre**		1		1		
	Associate Dean		1				1
	Dean's office	PA to Dean	1		1		
		Clerk cum data entry operator	2		1		1
7.7	**Dean-National and International Collaborations**		1		1		
	Associate Dean		1				1
	Dean's office	PA to Dean	1		1		
		Clerk cum data entry operator	2		1		1

1.3.5. Curriculum Development & Teachers' Training

Sr. No	Position	Staff	No.	'17-'18	'18-'19	'19-'20	'20-'21
9	**Jt. Director-Curriculum Development and Teachers' Training Centre (TTC)**		1	1			
9.1	Office of Jt. Director (TTC)	Sr. Clerk	1		1		
		Jr. Clerk cum Assistant to Jt. Director	3	1		1	1
		Programmer	2	1		1	

1.3.6. Directorate of Academics & Examination:

Sr. No	Position	Staff	No.	'17-'18	'18-'19	'19-'20	'20-'21
8	**Controller of Examination**		1				
	Office of CoE	PA to Controller of Examination	1	1			
	Examination Office						
8.1	**Jt. Director-Examination**		1	1			
	Office of Jt. Director(Examination)	Sr. Clerk	1				
		Jr. Clerk cum data entry operator	2		1	1	
	UG examination	Superintendent	3		3		
		Sr. Clerk	3		2	1	
		Jr. Clerk cum data entry operator	6		3	2	1
	PG examination	Superintendent	3		2	1	
		Sr. Clerk	2		2		
		Jr. Clerk cum data entry operator	4		3	1	
	PhD Section	Sr Clerk	1		1		
		Jr. Clerk cum data entry operator	1		1		
	Technical Staff-Examination Office	System Manager	1	1			
		Programmer	2	1	1		
		Data entry operators	4	2	1	1	

1.3.7. Finance Office:

Sr. No	Position	Staff	No.	'17-'18	'18-'19	'19-'20	'20-'21
10	**Finance Officer**		1	1			
	Office of finance Officer	PA to finance Officer	1	1			
	Dr. Registrar	Accounts and Budgeting	1	1			
	Accounts Office	Accountant-Superintendent	1		1		
10.1	Receipt Section	Accountant	1		1		
		Cashier	1		1		
10.2	Payment	Accountant	1		1		
		Senior Clerk	1		1		
		Junior Clerk cum data entry operators	2		1	1	
10.3	Internal Audit	Auditor	1	1			
		Junior Clerk cum data entry operators	2	1	1		
10.4	Stores	Asst Registrar	1		1		
		Stores keeper	1		1		
		Stores Verification officer	1	1			
		Senior Clerk	2	1	1		
		Junior Clerk cum data entry operators	3	1	2		

1.3.8. Registrar/Director-Administration Office:

Sr. No	Position	Staff	No.	'17-'18	'18-'19	'19-'20	'20-'21
11	**Registrar/Director-Administration**		1	1			
	Registrar's Office	PA to Registrar	1	1			
		Sr. Clerks	1	1			
		Jr. Clerks cum data entry operator	2	1	1		
11.1	**Dy. Registrar-Establishment**		1	1			
	Asst. Registrar						
	Establishment- Faculty		1	1			
	Establishment- Non-Teaching		1	1			
	Establishment Office	Superintendent	3	1	2		
		Sr. Clerks	3	1	2		
		Jr. Clerks cum data entry operator	6	2	2	2	
11.2	**Dy. Registrar-Academics**		1	1			
	Asst. Registrar						
	Academics -UG		1	1			
	Students- PG		1	1			
	Students-Research(PhD) and Certificate Courses		1		1		
	Students- Diploma (IoPE only)		1	1			
	Academic Office	Superintendent (UG+ IoPE, PG, Research)	3	2	1		
		Sr Clerks	2	1	1		
		Jr. Clerk cum data entry operator	6	1	2	1	2
12.	**Affiliation Section**						
		Superintendent	1	1			

Sr. No	Position	Staff	No.	'17-'18	'18-'19	'19-'20	'20-'21
	UG courses	Sr Clerk	1	1			
		Jr. Clerk cum Data Entry Operator	2	1	1		
	PG Courses	Sr. Clerk	1	1			
		Jr. Clerks cum Data Entry Operator	2	1	1		
13	**Estate Section**	Chief Executive Engineer	1		1		
		University Engineer(Civil)	1				
		University Engineer(Elec)	1				
		Supervisors	3				
		Foremen	2				
		Assistants	4				

1.3.9. Human Resource Requirements at the Four Regional Centres

Sr. No	Position	Staff	No.	'17-'18	'18-'19	'19-'20	'20-'21
1	**Director-Centre**		4	4			
	Director's office	PA to Director	4	4			
		Data entry operator	4	4			
2	**Jt. Director-Administration & Finance**		4	4			
	Jt. Director's office (*Administration & Finance)*		4	4			
	Administration Office	Senior Clerk	4	4			
		Data entry operators	8		4	4	
	Accounts Office	Accountant	4	4			
		Senior Clerk	4	4			
		Data entry operator	8		4	4	
	Stores	Stores Keeper	4	4			
		Data entry operator	8		4	4	
3	**Jr. Director- R&D Industry Relations**		4				
	Office of Jt. Director-Industry Relations	Sr. Clerk	4				
		Data entry operator	8		4	4	
	Office of Jt. Director-Curriculum development & Teachers' Training Centre	Sr. Clerk	4		4		
		Junior Clerk or programmer	8			4	4
4	**Jt. Director-ICT Systems**		4	4			
	Jt. Director's office- ICT	Data entry operator	8	4	4		
	Regional Computer Centre	System Manager	4	4			
		Computer Maintenance staff	8		4	4	
		Programmer	4		4		
5	**Jt. Director-Examination**		**4**		**4**		
	Office of Jt. Director (Examination)	Sr. Clerk	4		4		
		Data entry operator	4		4		
	UG examination	Superintendent	4		4		
		Sr. Clerk	8		4	4	
		Data entry operator	16		8	4	4
	PG examination	Superintendent	4		4		
		Sr. Clerk	4		4		
		Data entry operator	8		4	4	
6	**Affiliation and Data Section**						
	-	Sr Clerk	4		4		
	- UG courses	Data Entry Operator	8		4	4	
	- PG Courses	Data Entry Operator	4		4		
7	**Development and Maintenance**						
	Technical Staff	Maintenance Supervisor	4		4		

Sr. No	Position	Staff	No.	'17-'18	'18-'19	'19-'20	'20-'21
		Electrician	4		4		
		Supervisors	4		4		
		Assistants	6		4	2	

1.3.10. Human Resources at the 5 Sub-Regional Centres

Sr. No	Position	Staff	No.	'17-'18	'18-'19	'19-'20	'20-'21
1	**Jt. Director-Centre**		5	5			
	Jt. Director's office	PA to Director	5				
2	**Dy. Director-Administration & Finance**		5				
	Dy. Director's office (*Administration & Finance)*						
2.1	Administration Office	Senior Clerk	5				
		Data entry operator	5				
2.2	Accounts Office	Accountant	5				
		Senior Clerk	5				
		Data entry operator	10	5	5		
2.3	Stores	Stores Keeper	5	5			
		Data entry operator	5	5			
3	**Office of Jt. Director-Curriculum development & Teachers' Training Centre**	Sr. Clerk	5		5		
		Data entry operator	10		5	5	
4	**Dy. Director-ICT Systems**		5	5			
	Dy. Director's office-ICT	Data entry operator	5	5			
4.1	**Sub-Regional Computer Centre**	System Manager	5	5			
		Computer Maintenance staff	10		5	5	
		Programmer	10		5	5	
		Data entry operators	10		5	5	
5	**Dy. Director-Examination**		5		5		
	Office of Dy. Director (Examination)	Sr. Clerk	5		5		
		Data entry operator	5		5		
	UG examination	Superintendent	5		5		
		Sr. Clerk	10		5	5	
		Data entry operator	20		10	5	5
	PG examination	Superintendent	5		5		
		Sr. Clerk	5		5		
		Data entry operator	10		5	5	
6	**Affiliation and Data Section**						
	Office Staff	Superintendent	5		5		
	- UG courses	Data Entry Operator	5		5		
	- PG Courses	Data Entry Operator	5		5		
7	**Development and Maintenance Section**						
	Technical Staff	Maintenance Supervisor	5		5		
		Electrician	5		5		
		Supervisors	5		5		
		Assistants	10		5	2	3

1.4. E-Governance of the Administration

The University is establishing e-Office of NIC for the administrative functions of the University and it shall be completed by end of 2018. The Centres, sub-centres and affiliated colleges shall be connected through e-Office to track all communications, to bring transparency and accountability in the administration.

The e-Office is developed by NIC, Government of India. It is being adopted by the Government organizations, including Mantralaya. Punjab Technical University is amongst the State Universities who has adopted e-Office for governance. Dr. B A T. University shall be the first University who shall be deploying e-Office in the State of Maharashtra. The e-Office promises to provide a paperless flow of documents between Main Centre, Regional Centres, Sub-Centres and all affiliated colleges. The NIC-Maharashtra Unit has agreed to provide all the necessary support for successful deployment of the platform in the University.

The e-Governance shall bring accountability in the functioning of each officer of the University, cut down delays and give responsible governance. It is expected to avoid storage of papers, make them secure and available in real time throughout the State. The University shall be able to update in real terms all of its records and their applications.

The University shall develop necessary ICT infrastructure for successful implementation at the Main centres and Regional Centres.

The financial transactions of the University are already gone cashless with Netbanking and bank transfer from 2016-17. All academic operations, including admissions, communications to faculty, colleges, and students, are being converted into a State-wide University Information Management System (UMIS) from 2016-17. The information of all faculty members and students of every department and college is obtained through the UMIS. The University has started its own Intranet within the main centre for dissemination of knowledge and e-learning resources for all stake holders alike. However, e-resources, including library, e-books and e-journals will have to be substantially improved to make them available to students of all affiliated colleges. The Open course wares and Open Access Journal links are already provided to the students on the University Website.

Affiliation of Colleges

2. Affiliation of Engineering, Pharmacy, Architecture and HMCT Colleges

As the affiliating University of Technology in the State of Maharashtra, Dr. Babasaheb Ambedkar Technological University has started the affiliation of Engineering & Technology, Pharmacy, Architecture and HMCT colleges from September 2016.

In the AY year 2017-18, the University has affiliated 53 Engineering, 14 Pharmacy and 4 Architecture colleges. Another 50 colleges are expected in the academic year 2017-18 to file applications for affiliation. The affiliation has been planned in phased manner over the next four years. Since the affiliation is made optional to the existing colleges, the applications will have to be filed by the interested colleges on their own. It is hoped that in the next five years, all colleges from the State will get affiliated to the University so that a common syllabus will be implemented throughout the State, eliminating the perceived regional discrepancies in the quality of education and that of graduates.

2.1. Planning of Affiliation of Colleges

The first call of affiliation	28th September 2016
Last date of receiving applications	21st November 2016
Number of Colleges affiliated in 2016-17	75
Second call of inviting applications for affiliation	1st October 2017
Last date of receiving applications	31st October 2017
Expected additional Colleges to be affiliated in 2017-18	75
Third Call for affiliation	1st September 2018
Expected additional Colleges to be affiliated in 2018-19	100

The affiliation shall be on the basis of the parameters recommended by UGC and can be either temporary or permanent. The mandatory parameters shall have to be met by the Institute to get permanent affiliation. The Local Inspection committee also shall evaluate the capability of the management and leadership qualities by direct interaction with chairman and principal of the Institute.

2.2. Projected Affiliation of Colleges to the University and Corresponding Number of Students registered with the University in the next five years

2.2.1. The University plans to affiliate colleges from the State in the following manner (cumulative in Nos.)

Academic Year	Engineering & Technology		Pharmacy		Architecture		HMCT	
	Planned	Achieved	Planned	Achieved	Planned	Achieved	Planned	Achieved
2017-18	50	53	20	14	10	6	1	0
2018-19	100		50		25		5	
2019-20	150		100		40		10	
2020-21	250		160		55		25	
2021-22	368		168		60		30	

2.2.2. Expected number of students in UG Programmes (cumulative in Nos.)

Academic Year	Engineering & Technology	Pharmacy	Architecture	HMCT	Total number of Students
2017-18	15000	800	400	40	16240
Achieved/target	11344/17910	995/980	140/287	0	12426
2018-19	60000	4000	2000	400	66400
2019-20	135000	12000	4800	1200	153000
2020-21	300000	25600	8800	4000	338400
2021-22	441600	26880	9600	4800	482880

2.2.3. Expected number of students in PG Programmes (cumulative in Nos.)

Academic Year	Engineering & Technology	Pharmacy	Architecture	HMCT	Total
2017-18	2700	360	180	18	3258
Achieved/target	898	37	13		948
2018-19	10800	1800	900	180	13680
2019-20	16200	3600	1440	360	21600
2020-21	27000	5760	1980	900	35640
2021-22	39744	6048	2160	1080	49032

2.2.4. Expected number of students in PhD Programmes (cumulative in Nos.)

Academic Year	Engineering & Technology	Pharmacy	Architecture	HMCT	Total
2017-18	50	40	10	0	100

Graduate Enrollment Ratio (GER)

3. Population and Graduate Enrolment Ratio(GER)

Professional Education has been a major force in socio-economic transformation and has been highly sought after by all strata of society, particularly by the population in middle level and lower levels. Engineering education, in particular, has given rise to new aspirations in the last 2 decades and hard work as engineers pays rich dividends. For the growth of economy and improvement in life style of increasing population, advances in technical education and availability of skilled manpower are equally important. Technology, in general, has been adopted by masses for convenience and necessity.

The revolution in IT and Telecommunication industries has brought down the barriers between social classes too. The affordable tools and in some cases disruptive business innovations have made access to technology gadgets easier and society more knowledgeable and receptive to newer ideas. But it also makes the population more aware of disparity and provides impetus to rush for higher education. The world economy has increasingly become dependent on knowledge and information is available for everyone, anytime and anywhere. However, we are increasingly becoming technology consumers and less innovative in developing newer technology products. Access to education has been increasing at a faster rate. The number of colleges has increased at 3.9% annually in India during FY11-15. The GER (enrolment as a percentage of the eligible official population) improved for higher education from 8.1% in FY02 to 24.3% in FY15; for Class (IX-XII) it has improved from 33.3% in FY02 to 65.3% in FY15.

3.1. Key findings of National Employability Report of Engineers

The report of the National Employability Survey-2016 indicates that as compared to 2014, the condition of the technical education in the State of Maharashtra has suffered more as compared to other states in the country. In 2014, only 18.4% of engineers were employable for the software services sector, 3.21% for software products and 39.84% for a non-functional role such as Business Process Outsourcing. These numbers as of today stand at: 17.91%, 3.67% and 40.57%, respectively. Only 3.84% of engineers qualify for a startup technology role. This is a big concern and would surely hamper the growth of startups in India. Being the biggest employers of Engineers from all disciplines, there is a need to scale up skill development in IT and EXTC sector to make an impact on employability of the graduates. The core manufacturing sector is absorbing some engineers but not to the extent of graduates coming out of colleges.

The survey also categorically points out that States with the highest number of colleges show the lowest percent employability. The more number of colleges does not mean more quality engineers. Most of the colleges have good infrastructure but quality of teachers and their number are questionable. Even in the University, 45 faculty positions are vacant while no new positions are not created despite increased intake or starting new PG and UG programs in the past. The University shall have to fill the vacant positions as early as possible to ensure imparting quality education to the students.

There is a greater need for improvement of the quality of education in colleges rather than concentrating on building new colleges. On the other hand, there is an argument that only quality colleges will survive in the competitive environment. Our own survey shows that more colleges also mean less quality teachers per college and colleges employ whoever is available at the lowest salary structure. Many of the teachers in private engineering colleges have no ME qualifications. The country suffers from concentrated employment in a few sectors, which raises the question about the time taken for de-skilling and re-skilling,

leading to frictional unemployment. Clearly, the gap between demand and its supply is increasing with: a) the traditional public sector, manufacturing, IT/ITeS and BFSI areas of job creation waning, b) slow evolution of unconventional sources of employment such as personal and social service and c) rapid supply of qualified labour with an inherent mismatch in scope.

The problem brewing here, as per the Report on Engineer's Employability 2016 is on two counts: a) the growth rate of the number of qualified individuals entering the system and subsequently the increase in the labor force, far exceeds the rate of job creation, and b) the skills being imparted through formal education are not aligned with the activities of best employment opportunities. There has been no significant improvement in employability of the engineers in the last two years. There is a need to scale-up skill development to make a measurable impact on employability. The University has started working very closely with the national skill development councils for improving quality of engineers by training programs for faculty in specified emerging areas. The University has decided to adopt the 'Train-the-Trainers' approach to address this issue.

There is clear drop in number of opportunities as against more number of engineers coming in the field for job, making it highly competitive. Unless the jobs are created to absorb the graduates, the unemployment is likely to increase. The increased automation and deployment of autonomous equipments are clearly to hurt conventional jobs in coming years. On the other hand, industry is looking for fresh talent in new and upcoming areas. The University has decided to make Engineering education more dynamic with change in syllabi taking place faster with approval of all academic bodies obtained in reasonable time frame. The Choice Based Credits System (CBCS) is definitely an answer for this issue.

The technology startups are a new business story in India, although e-commerce has taken strong root in the country. To leap forward, we need better and deeper understanding of new products, processes and systems, as well as candidates ready to take risk having higher technology caliber, and an attitude to startup. The median salary aspiration of Engineers is INR 340 thousand. The talent in newer areas is getting expensive and rare. There must be huge gap of available skills and demand of manpower in technology sector.

3.1.1. Employment vs employability

The India Strategy report of J M Financials, June 2017, throws a different light on the disparity created in employment vs employability. As per this report, the ratio of the number of students who earned higher education degrees to new jobs created had worsened from 9x for the three year period FY11-12 to 27x for FY15-16. Further, as per the latest employment surveys, the job creation at 0.19mn over 9MFY17 is running short of the 8.8mn who graduated in FY16. An increase in labor productivity and decline in private capex are adversely impacting the ability of the private sector to be the primary driver of job creation going forward

Thus the efforts are also required to improve employment generation along with generating more professionals. The admissions in engineering disciplines are declining on the last two years and there is less emphasis on entrepreneurship in traditional education. To reduce this gap and to improve employability of graduate engineers, we need to also create new businesses and develop new technologies, new processes, new systems or new products. The key to improve Engineering Education is to educate and train the engineers to create new products, new processes and new systems and thus develop new economy. It also means having newer models of functioning and accountability. The increasing number of engineers will not suffice to contribute to the State's economy, unless the manpower is trained in right manner and used to solve the problems that the society faces.

3.2. Graduate Enrolment Ratio (GER)

The following chart shows the GER rate of Maharashtra has increased from 23% to 29.9% in the last five years and approaching the target of 30% by 2021. However, the State is still far away from some other States in the country and internationally. In China, our closest competitor, boasts a GER in excess of 40%. The GER of SC candidates matches that in overall GER while GER of ST candidates lags behind almost by a factor of 2. A major challenge shall be providing assurance of employment to every engineering graduate when we increase GER by providing more admissions to Engineering aspirants. Every fresh graduate is expected to have skills related to subjects being studied. Maharashtra is the second largest state in India in terms of population i.e. 11.2 crore which is 9.3 per cent of the total population of India and is highly urbanized with 45.2 per cent people residing in urban areas. Maharashtra is also becoming the Education Hub, like the other Southern States and attracts students from other states. With an average decadal growth rate of 10.2%, the population may grow substantially. As some of the districts are showing negative population growth, the imbalance in population in different regions is likely to grow. It still does not consider migration of people to metros and other cities in search of better employment opportunities.

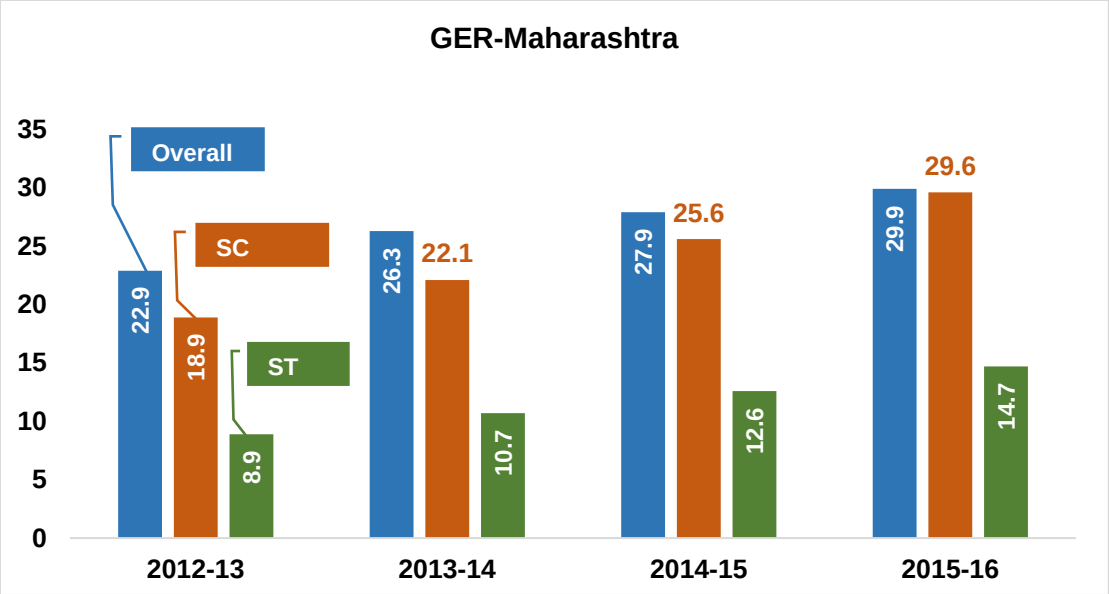


Figure 3.2 – GER of Maharashtra for the last 4 years

3.3. Population and GER

The PME Board analyzed the data of district-wise population of the State as shown in Table 3.3 below, and projected the population into 2021 considering growth in the last three decades. The average decadal % Growth Rate: 10.5%. The GER of the State has improved from 27 in 2011-12 to 29.9 in 2017 and it is likely that target of 30 will be surpassed in 2021. We should aim at the GER of 35 by 2025 and 40 in 2030. The increased population and ever-increasing aspirations of the society are taken into account for suggesting additional professional colleges in the State in different faculties of Engineering and Technology, Pharmacy, Architecture and Hotel Management and Catering Technology.

Table 3.3 – Population growth estimates

Sr. No.	District Name	Population in 2011 ['000]	%age Decadal Growth ('91-'01) [%]	%age Decadal Growth ('01-'11) [%]	Population density per km	Population density per km	Estimated Annual Growth Rate in 2025	Estimated Population by compounded growth
1	Nandurbar	1,646	23.4	25.5	220	276	2.76	2117
2	Dhule	2,049	15.9	20	237	285	2.41	2498
3	Jalgaon	4,225	15.5	14.7	313	359	1.39	4889
4	Buldana	2,588	18.4	15.9	231	268	1.34	3030
5	Akola	1,818	20.6	11.6	287	321	0.26	2040
6	Washim	1,196	18.3	17.2	208	244	1.61	1418
7	Amravati	2,888	18.5	10.8	214	237	0.31	3216
8	Wardha	1,296	15.9	4.8	196	205	-0.63	1360
9	Nagpur	4,654	23.7	14.4	411	470	0.51	5369
10	Bhandara	1,198	11.2	5.5	278	293	-0.02	1266
11	Gondia	1,323	10.5	10.1	229	253	0.97	1463
12	Gadchiroli	1,072	23.3	10.5	67	74	-0.23	1190
13	Chandrapur	2,194	16.9	6	181	192	-0.49	2329
14	Yavatmal	2,776	18.3	12.9	181	204	0.75	3156
15	Nanded	3,357	23.4	16.7	273	319	1.00	3962
16	Hingoli	1,179	19.8	19.4	205	244	1.90	1429
17	Parbhani	1,836	18.1	20.2	246	295	2.23	2242
18	Jalna	1,958	18.2	21.8	209	255	2.54	2429
19	Aurangabad	3,696	30.8	27.3	286	365	2.38	4838
20	Nashik	6,109	29.7	22.3	322	393	1.49	7616
21	Thane	11,054	54.9	35.9	851	1157	1.69	15729
22	Mumbai-Sub	9,332	28	8	19373	20925	-1.20	10106
23	Mumbai	3,146	5.1	-5.8	21261	20038	-1.67	2968
24	Raigarh	2,635	21	19.4	309	368	1.78	3193
25	Pune	9,427	30.7	30.3	462	603	2.99	12706
26	Ahmednagar	4,543	19.8	12.4	237	266	0.50	5139

27	Beed	2,585	18.6	19.7	202	242	2.08	3142
28	Latur	2,455	24.1	18	291	343	1.19	2934
29	Osmanabad	1,661	16.5	11.7	196	219	0.69	1866
30	Solapur	4,316	19.1	12.1	258	290	0.51	4868
31	Satara	3,004	14.6	6.9	268	287	-0.08	3218
32	Ratnagiri	1,613	9.9	-5	207	196	-1.99	1534
33	Sindhudurg	849	4.4	-2.3	167	163	-0.90	830
34	Kolhapur	3,874	17.9	10	458	504	0.21	4279
35	Sangli	2,821	16.9	9.2	301	329	0.15	3092
Total								**133,461**

3.4. Regional Balance

Within the State of Maharashtra, the competition to get into good colleges is severe and it has led to disparity in quality of education. The trend is moving to colleges in big metropolitan cities such as Mumbai, Pune, Aurangabad and Nagpur. As a result, a large number of colleges are concentrated in these regions where even 2nd shift is working while, colleges in rural settings are suffering from inadequate number of admissions and some of them are closing down even when there has been significant investment in the infrastructure in these colleges.

Table 3.3 in the preceding section shows the population as per census 2011. In 10 years, there is increase in population at an average annual growth rate of 1.5%. The existing colleges per million of population in districts is sufficient to cater to the need of the aspirants. If the population grows at the expected rates and correspondingly number of engineering aspirants increases, then we will need more colleges in 2021 to meet the need of GER of 35%. This increase should be spread over 5 years.

The Board evaluated the current population in each district and estimated that per million population, we need at least two engineering, three pharmacy, one architecture and one HMCT colleges in each district. Based on these statistics very few new engineering colleges are suggested in the perspective plan. Although the current number of colleges in some districts may be still lesser than the above recommended numbers, considering the current trend of declining admissions in Engineering disciplines, no new engineering colleges are proposed in districts of regional centres. There are still limited Pharmacy colleges and corresponding limited number Pharmacy seats for admission. Additional pharmacy colleges are recommended on the basis of the statistical data.

For promotion of tourism, we might need to promote HMCT colleges in certain areas, like in Konkan districts which is short of HMCT colleges despite having strong potential for development of Tourism Industry. The given numbers shall ensure existence of enough number of professional colleges in every district in the State so that students need not migrate to other districts and particularly to metropolitan areas. However, the perception still exists that jobs are mainly concentrated in metros, cities and big towns and availability of engineering colleges in the region may not deter the students from migrating to metro areas. The only way the migration can be stopped is by providing opportunities in far flung areas with equal earning power, and making the companies to access these remote places instead of concentrating on colleges in the mega cities for their manpower requirements.

Attention will have to be given in approving colleges in districts where demands may grow in coming years. In view of declining admissions to engineering colleges, however, no new engineering colleges are proposed in the State this year. The current decline in demand for admissions of engineering degrees is mostly because of large number of unemployed engineering graduates. While industry in increasingly demanding graduates with quality and better skills, the education delivery needs to be made outcome based instead of input based.

3.5. Intake capacity and geographical location of colleges

A survey of HSC results in the state of Maharashtra shows that more number of students are passing with First Class and Distinction in the HSC examinations and the average of such students in districts such as Gondia, Yavatmal and Akola is almost 50-65%. Districts, such as Akola, Beed, Buldhana, and Yavatmal indicate much higher increase in aspiring candidates who could be entering into professional colleges over years. But number of colleges offering quality technical education in these districts is less. These districts are not well developed for industrial activities but the increasing trend indicates the aspirations of the population to improve their own life. Refer to Table 3.5(a) below.

The number of students appearing for HSC examination has been increasing at almost average rate of 7%. In districts, such as Hingoli, Jalna and Washim, this number increasing at more than 10%. Obviously, these students aspire for professional education being eligible. As a result, the number of aspiring students per UG seat available in higher education is the highest in districts like Gondia, Jalna and Parbhani. Even in districts like Akola, Beed, and Washim, the availability of UG seats is poor compared to that available elsewhere.

If the opportunities are less and if not enough seats are available in these regions in professional courses, migration to cities and metros will continue. In the district of Gondia, where we do not have enough higher educational opportunities, a couple of professional colleges can be considered. The districts in RED are to be watched for future requirements.

However, the demand for the engineering intake has gone down in the last two years and many colleges are being shut down because of poor intake, some having zero admissions. **In view of this, in general, no new engineering colleges are proposed**. However, the need of quality engineering colleges persists in few districts, such as Gondia, Akola and Washim. We may allow new engineering colleges in these areas if the demand rises in five years. If quality education is provided in these regions, it will stop migration of the students to metros and big cities making their education affordable in their own home towns. The endeavor of the University shall be to raise the quality of education in these colleges so much that they develop themselves into potential candidates for autonomy in future. The proposal for the growth in institutes based on the above study and analysis is provided in Table 3.5(b) above.

3.6 Field of Architecture

The number of Architects required per 1000 population as per International standards is 1. Theoretically India would require for the population of 1350,000,000 about 1,350,000 architects. Presently, there are about 80,000 Architects in the country which is about 6% of the requirement. The gap is being filled by non-architects. As per a recent Supreme Court Judgement, only registered qualified Architects can provide Architectural service. Thus, there is a huge gap in the requirement and the availability of Architects in the country

The practice of Architecture in India is regulated by the Architects Act through the process of registration of qualified Architects by the Council of Architecture. The recognized qualification essential for registration is a Bachelor's Degree in Architecture awarded by a University which is established under a State or a Central Act. Unlike elsewhere in the world there is no mandatory period of practice/ apprenticeship under an Architect before registration. In other countries, this period varies between 2 and 7 years which is followed by a professional Examination. Due to lack of internship provision, fresh graduates without any field experience are released into the market and subsequently are unable to provide service of the

desired quality. However, due to the huge mismatch between supply and demand there is no paucity of job opportunities for Architects in India.

The next ten years will see further gap in the demand and supply of Architects. The Pradhan Mantri Awas Yojana envisages housing for all by 2022. In the urban sector alone, the shortfall in housing is expected to touch 3.4 crores by 2022. Obviously, we are looking at a very huge task requiring a huge army of trained persons including Architects. The 73rd and 74th amendments to the constitution have also resulted in requirement of Architects at semi-urban and rural areas. The drive for improved infrastructure will also push up the demand for Architects in the country.

Number of Architecture colleges required in the State

On the basis of the population growth, we are considering at least one architecture college in each district. Maharashtra has about 90 colleges of Architecture as of now with a total intake of about 2000.This needs to be at least doubled so that the huge gap of about 90000 Architects required in the State presently can be met over the next 10 years. Architecture as is leant today has a very elitist quirk. The Education through its syllabus and teaching methodology will have to be changed to expose students to real life problems of urbanization, informal housing (slums), environmental challenges and advent of new and sustainable technologies. There is tremendous scope for multi-disciplinary research in the above mentioned fields. Also more and more hands on approach in problem identification and possible solution finding with community participation needs to be included in the course curriculum.

The university may consider in near future a multiple entry multiple exit program. B.Arch. consists of 2 stages: one for 6 semesters and two for 4 semesters. We could consider giving a non-practicing degree like B.Sc. in built environment after 3 years and allow students to take time off to get practical experience and then come back to do the remaining 2 years. This practice is followed in many countries abroad. We should introduce multi-disciplinary Masters Programs in emerging fields like environment, energy, project management etc. with industry participation. We should also conduct short time courses for practicing professionals under continuing education schemes or for skill enhancement.

3.7 Pharmacy Education

The pharmacy profession comprising the industrial and practice sectors is undergoing a rapid change. Indian Pharma industry ranks 4th in volume and 13th in value in the global pharmaceutical market. Pharma's growing industrial and practice sectors need clinically and technologically trained pharmacy professionals. The Pharmacy education in India is tightly regulated by the Pharmacy Council of India. PCI has prescribed a nation-wide syllabus to the Institutes and Universities that has to be followed for the graduates to get eventually registration with the PCI. The University has adopted the PCI syllabus for its affiliated pharmacy colleges.

Indian pharmaceutical industry, with current market size of $27.57 billion (last reported in 2016) is expected to reach a mark of $55 billion by 2020 at a CAGR of 15.92%, according to a report by the Indian Brand Equity Foundation (IBEF). In the next three years, India is projected to be among the top three pharmaceutical markets in terms of growth rate and the sixth largest market globally in absolute size. On one hand the employment prospects of the graduates seem promising, the skillset required in the pharma industry is rapidly changing. Pharma industries in the country, had earlier relied on modified processes to compete in the international market. With increasing competition from China and other countries, however, the industry is looking into better products, biosimilars and new chemical entities. The PCI prescribed syllabus leaves very little space in innovation at teaching but at research level, practices to meet international standards of quality should be focus.

India has made considerable progress in healthcare outcomes over the past few decades. The average life expectancy of Indians has risen from 58 years in 1990 to 66 years in 2013. However, there is much work to be done in terms of improving healthcare access to citizens. Moving from creating medicine to creating holistic healthcare solutions to address the entire continuum of care shall require appropriate technology and digital interventions. In India, where the doctor to patient ratio poses a challenge, in order to serve patients better, pharma industry and Institutes need to collaborate with devices and diagnostics

companies, bringing data analytics for complex conditions. The Pharmacy education thus needs collaborative approach with other technology disciplines. The graduates must be familiar with the regulations and new opportunities including devices, data analytics and insurance.

The government's 'Start-Up India' initiative is creating an enabling ecosystem through a number of policies that include seed and venture funding to support biotech entrepreneurs, incubators and accelerators. The National Biopharma Mission is an industry-academia collaborative mission for accelerating discovery and early development of biopharmaceuticals and should be used by the Institutes to partner with industries. The Pharma research thus has very challenging role cut for it in coming years to remain relevant. Competition has increased even in formulations, depressing prices and making it tough to maintain market share. It's critical for pharma companies to develop complex generics, specialty products, biosimilars and innovative products, which will drive future growth and offset pricing pressures in generics. The pharma education and research should direct itself in developing inherent skills for developing innovative/specialty materials, apart from knowledge of strict and rigid regulations of the Industry requirements.

Considering the demands of the industrial growth and very small number of quality pharmacy institutes, particularly involved in cutting edge research, we suggest presence of 3 pharmacy institutes in each district and at least one of them to have strong research program leading to PG degree and doctoral degree. A combination of the Pharmacy Institute with a hospital and an engineering college should be a preferred multidisciplinary model for education and development in the region.

3.7 Woman Empowerment

The last few years have seen a surge in women students entering into engineering education. Typical % of girls in engineering colleges is about 35%. In general, higher education sector has 46% girls enrolled in 2015-16. Considering the latest reports that 48% of student population (300 million) in the State is made of girls, we expect that this % will rise to 40% in the engineering programs in the next five years. The women's number in workforce is already 27% which shall also raise with more women engineers coming into the market. Pharmacy is already dominated by girl students than boys. However, the number of girls in technical and professional courses is yet to catch up with the numbers in Arts and Humanities courses, mostly because in certain sectors of engineering, preference is still given by the Industry for the male students.

Table 3.5(a) – District-wise increase in percent of potential students for admission to professional courses.

District	Number of Meritorious Students competing for every UG Seat as per 2017	D+1 Eligible in 2017	CAGR of Students appearing for HSC over past 4 years	Average of %age students in Distinction & 1st Class Over 4 years
AHMEDNAGAR	2.64	15,750	5.03%	39%
AKOLA	7.06	6,569	6.16%	54.03%
AMRAVATI	1.32	7,646	5.74%	41.91%
AURANGABAD	2.31	17,916	10.86%	53.35%
BEED	10.01	13,207	8.26%	65.73%
BHANDARA	2.38	2,998	2.56%	36%
BULDHANA	2.78	7,853	7.27%	58.19%
CHANDRAPUR	1.95	4,026	3.61%	41.71%
DHULE	2.85	8,382	7.52%	26.56%
GADCHIROLI	4.02	1,207	6.10%	39%
GONDIA	69.08	4,145	8.07%	28.88%
HINGOLI	7.38	2,215	10.87%	36%
JALGAON	2.68	11,195	6.92%	36%
JALNA	12.4	6,322	20.59%	43.53%
KOLHAPUR	1.25	10,689	4.41%	40.26%
LATUR	3.79	7,949	4.90%	35%
MUMBAI CITY	1.07	4,975	0.40%	50.53%
MUMBAI (SUB)	2.82	15,938	2.86%	39%
NAGPUR	0.71	14,437	5.47%	40.63%
NANDED	3.85	6,193	7.11%	17.50%
NANDURBAR	5.32	4,467	4.60%	47.88%
NASHIK	1.22	12,467	6.54%	36%
OSMANABAD	1.04	1,722	5.26%	45.03%
PARBHANI	20.48	6,143	6.32%	45.41%
PUNE	0.54	24,896	3.06%	44.99%
RAIGAD	0.66	3,844	3.48%	31%
RATNAGIRI	1.22	2,165	0.56%	30%
SANGLI	1.17	6,502	3.55%	30%
SATARA	1.61	6,587	3.43%	32%
SINDHUDURG	2.5	2,100	-0.61%	34%
SOLAPUR	1.75	11,026	3.57%	27.30%
THANE	1.7	15,356	3.84%	48.95%
WARDHA	0.78	2,776	4.37%	26.72%
WASHIM	6.63	4,770	13.42%	48.85%
YAVATMAL	1.5	3,596	7.93%	50.62%

Table 3.5(b) – Proposed Colleges in Maharashtra by 2025 to meet GER of 35

for GER of 35District	Population	Estimated Population	Existing Colleges per million				Proposed New Colleges in Maharashtra by 2025			
	2011	in 2021	Engg	Pharma	Arch	HMCT	Engg	Pharma	Arch	HMCT
	['000]	['000]					Expected ratio colleges per million			
							2	3	1	1
Ahmednagar	4,543	5139	2.2	4.2	0.7	0.2			1	1
Akola	1,819	2040	1.6	0.0	0.5	0.0	1	3	1	1
Amravati	2,888	3216	5.5	1.7	0.0	0.0		1	1	1
Aurangabad	3,696	4838	4.1	3.0	1.4	0.5		1	1	1
Beed	2,586	3142	1.2	4.6	0.4	0.0	1		1	1
Bhandara	1,199	1266	0.8	1.7	0.0	0.0	1	2	1	1
Buldhana	2,588	3030	1.9	3.1	0.0	0.0	1	1	1	1
Chandrapur	2,194	2329	1.8	1.8	0.0	0.0	1	2	1	1
Dhule	2,049	2498	2.4	5.4	0.0	0.0			1	1
Gadchiroli	1,072	1190	0.9	0.0	0.0	0.0	1	3	1	1
Gondia	1,322	1463	0.8	0.8	0.0	0.0	1	2	1	1
Hingoli	1,179	1429	0.8	0.8	0.0	0.0	1	2	1	1
Jalgaon	4,224	4889	2.6	1.4	0.7	0.0		2	1	1
Jalna	1,958	2429	0.5	2.0	0.0	0.0	2	2	1	1
Kolhapur	3,874	4279	4.6	3.4	0.8	0.0				1
Latur	2,456	2934	1.6	4.5	0.0	0.0	1		1	1
Mumbai	3,146	2968	10.2	4.1	4.8	1.3				
Mumbai Suburb	9,332	10106								
Nagpur	4,653	5369	8.6	4.1	1.7	0.9				1
Nanded	3,357	3962	1.8	2.4	0.3	0.0	1	1	1	1
Nandurbar	1,646	2117	0.6	3.6	0.6	0.0	2	1	1	1
Nashik	6,109	7616	2.0	4.4	0.0	0.5	1		1	1
Osmanabad	1,660	1866	2.4	2.4	0.0	0.0		1	1	1
Parbhani	1,836	2242	0.5	2.7	0.0	0.0	2	1	1	1
Pune	9,427	12706	7.1	4.9	2.8	0.6				1
Raigad	2,635	3193	1.9	1.5	1.5	0.0	1	2	1	1
Ratnagiri	1,613	1534	3.1	3.1	0.0	0.0			1	1
Sangli	2,821	3092	2.5	3.5	0.4	0.0			1	1

Satara	3,004	3218	2.7	4.3	1.0	0.0			1	1
Sindhudurg	849	830					1	2	1	1
Solapur	4,316	4868	3.5	1.9	0.2	0.0		1	1	1
Thane	11,054	15,729	0.6	0.3	0.2	0.0	2	3	1	1
Wardha	1,296	1360	6.9	2.3	0.8	0.0		1	1	1
Washim	1,197	1418	0.8	3.3	0.0	0.0	2	1	1	1
Yavatmal	2,775	3156	2.2	1.1	0.0	0.0	1	2	1	1
	112,373	133,461					**24**	**37**	**30**	**33**

3.8 Professional and Industrial Characteristics of Districts

The PME Board analyzed the data on industries and economic activities in different districts. There is wide disparity in the professions, and industries in the state. Most of the modern industries and knowledge /IT based activities are centered around the four major metros while in few districts the economy is heavily dependent on agriculture. Heavy industries like power, Cement, and Coal are few and are localized in remote areas. Considering that the new opportunities are available in rapidly changing computer engineering and Information Technology, migration of students towards the metropolitan cities is understandable. If the industries offer better job opportunities in non-metro areas, this migration can be reduced giving at the same impetus for local economy growth.

The region wise disparity of number of professional colleges in the State is a consequence of the spread of the industries. The new knowledge based economy has the potential to spread the student's population more evenly. The Industries also need to recognize that talent may be available in colleges in far flung rural areas too.

The following Table 3.7 shows district-wise distribution of different type of industries through the State of Maharashtra. The filled cells indicate type of the major economic activities in those districts.

- Agriculture still seems to be the main source of income although certain districts have sizable sugar, chemical, pharmaceutical, cotton and textile industries which could be based on agriculture.
- IT and IT enabled services are also concentrated in few areas. Healthcare is mainly concentrated in metropolitan cities.
- Heavy industries like power, Auto, Cement, and Coal are few and are localized in remote areas.
- The Technical Institutes in the area should concentrate in coordinating with local industries for training of their students and corresponding courses should get more attention.
- The Food Engineering courses in districts with agri-based economy may be better than other courses. The districts such as Akola, Washim, Sindhudurg, Hingoli and Gadchiroli indeed need more technology Institutes with attention to local economy.
- There has been spurt in intake in IT and Communication Technology courses in the last decade. Yet we do not see large and wide spread industries in these sectors in the State, affecting the employment of the graduates. On one hand, the policy of the Government is that no student should be deprived of the opportunity in technical education, but merely increasing number of graduates without improving the industry infrastructure for employment may become counterproductive.
- This distribution should be seen more as opportunities that exist to establish those industries in the districts where a sizable number of trained engineers are also available.
- Currently, the capacity of Technical Education in the colleges is underutilized with large vacancy in

some colleges. Students prefer institutes in urban areas or where industries are concentrated from employability of view. If the intake is to be maintained in Institutes with adequate infrastructure in rural areas, the quality of education in those colleges must be increased and Industries must be set up near those Institutes, if possible, by providing incentives.

- The key for improvement is quality of faculty in the Institutes. An exposure of the faculty to research, industry and corporate culture is probably required in immediate future, along with training in pedagogy/andragogy.
- Demand for Pharmacy and architecture courses shows an increasing trend. Healthcare industry is, however, concentrated in very fewer areas. Alternate medicines have crept into pharmacy research in the last few years, particularly in nanotechnology and drug delivery systems. The natual products based industries would do far better in certain areas.
- Rural areas are distant from cities and in some cases there is poor connectivity. The poor connectivity is major issue even in the University area of DBATU because of forest land surrounding the University. If the ICT infrastructure is made available to such colleges, it shall enable imparting education at such distant places with quality. It can also bring down cost of education significantly.
- The University shall emphasize on training the faculty in pedagogy/andragogy, industrial exposure, ICT based self-learning, live projects in collaboration with industries, hands-on learning and access to e-resources in the University and in the affiliated colleges.

Table 3.7 - Industries In Maharashtra-District-wise

Colour indicates the type of major economic activity in the district

District	Agri & Processing	Sugar	Chemical & Pharma	Cotton & Textile	Healthcare	Electronics	IT-ITES	Auto	Power & RE	Coal & cement	Metal & Manufg	Finance	Others
Ahmednagar	■	■											
Akola	■			■									
Amravati				■		■	■		■				
Aurangabad	■		■	■			■	■			■	■	■
Beed	■												■
Bhandara			■			■		■			■		
Buldhana	■		■	■							■		
Chandrapur										■			
Dhule				■					■				
Gadchiroli	■		■										
Gondia				■					■	■			
Hingoli	■					■					■		
Jalgaon	■										■		
Jalna	■		■	■							■		■
Kolhapur				■							■		
Latur	■		■								■		
Mumbai			■		■		■					■	■
Nagpur	■			■		■	■		■		■		■
Nanded		■	■	■			■			■			■
Nandurbar	■								■				■
Nashik	■	■	■	■		■		■	■		■		■
Osmanabad	■	■	■								■		
Parbhani	■					■	■						
Pune	■	■					■	■			■		
Raigad	■		■	■			■				■		
Ratnagiri			■						■		■		■
Sangli	■	■		■		■			■				
Satara	■							■			■		
Sindhudurg	■		■								■		■
Solapur	■			■			■						
Thane	■		■	■		■					■		
Wardha		■	■	■							■		
Washim	■					■					■		■
Yavatmal	■			■						■			

Academic Development Plan

4 Academic Development

The activities that are to be undertaken by the Academic Section of the University are grouped around some Key Performance Areas (KPA) viz Accreditation, Teaching-Learning processes, Examination, Curriculum design and Development, Student grievances and Program evaluation. These activities are designed with a goal to maximize the use of technology and achieve a satisfactory performance against NBA/NAAC parameters

4.7 Statutory Responsibilities for Academic Section

The Academics section shall be responsible for Planning of academic activities in the University Departments, Affiliated colleges and Conducted Institutions. The Academic Section shall be headed by the Director (Academics & Examination) and assisted by Jt. Directors (Examination), the Deans of faculties and UG/PG/Diploma Sections

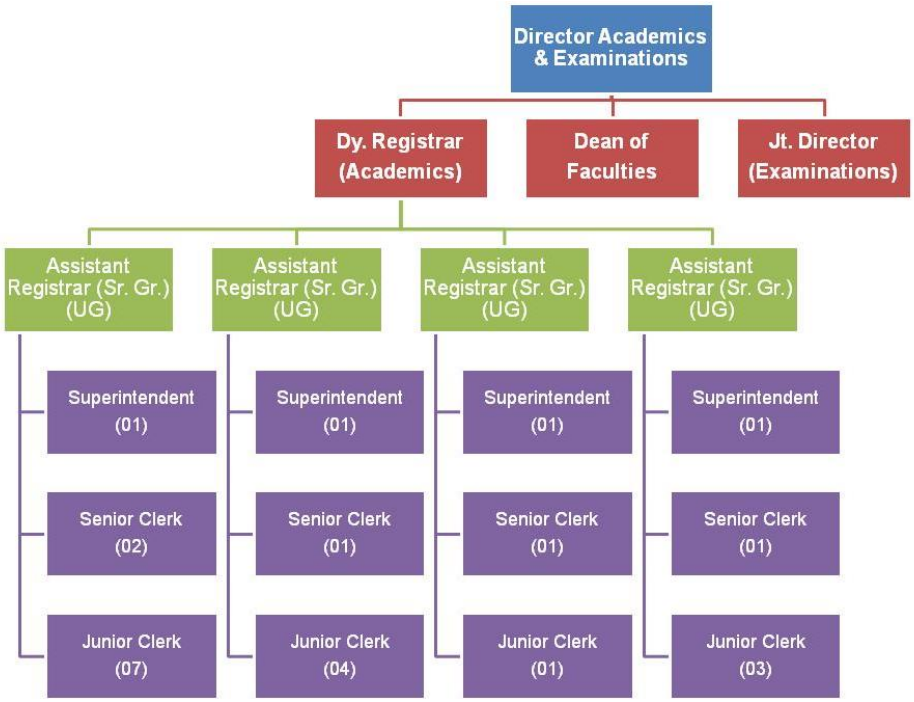


Figure 4.1 – Academic Section Organizational Structure

4.8 Academic Section functions

1. Curriculum development with support from Deans of faculties,
2. Formulate the policies and development program of the faculty
3. Supervision of academic affairs such as hiring, promotion, tenure, and evaluation (with faculty input where appropriate)
4. Training of teachers in University departments and affiliated colleges,
5. Coordination and conduct of examinations, declaration of results in time,
6. Maintenance of academic standards in the University,
7. Accreditation of courses in the University departments and in affiliated colleges,
8. Admissions of students in courses,
9. Appointments and approval of faculty in affiliated colleges and University departments and conducted Institutes
10. Student's academic grievances,
11. Convocation and
12. Any other matter related to Academics

- The Director- Academics & Examination shall convene meetings of the faculty, as and when required, in consultation with the Vice-Chancellor and shall preside over the same. He shall formulate the policies and development program of the faculty and present the same to the appropriate authorities for their consideration
- He shall be responsible for the academic development of the faculty and shall ensure proper implementation of the decisions of the Executive Council, Academic Council, and the Board of Examinations in respect to his faculty and the decisions of the faculty and the Boards of Studies under his purview.
- Subject to the superintendence, direction and control of the Vice-Chancellor, the Director- Academics & Examinations shall, after taking such advice as he thinks necessary, decide upon the grievances of students regarding the enrolment, eligibility, migration, scholarships, studentships or freeships, grant of terms, admission to university examinations
- He shall enquire, on being directed by the Academic Council, in to malpractice related to any academic program in his faculty by a University department, affiliated or conducted college or recognized institution and report the findings to the Academic Council.
- He shall monitor the quality of education by the way of accreditation of the programs by concerned authorities in the University, conducted colleges and Institutes, Centers, Schools and affiliated colleges.
- He shall conduct the surveys in the University, conducted colleges and Institutes, Centers, Schools and affiliated colleges of the students and faculty for feedback on the quality of education and recommend necessary remedial measures for implementation in the University and affiliated colleges

4.9 Responsibilities of the Deans of the University

The Deans (Faculties) and Dean (Research and Development) shall be responsible for implementation of the academic and research policies, respectively, as approved by the Executive Committee in respect of academic development, maintenance of standards of teaching and training of teachers and research within the Faculties.

The Deans shall be responsible for the academic development and research development of the Faculty in the University departments and the affiliated colleges and shall ensure proper implementation of the decisions of the Executive and Academic Councils in respect of the matters under the purview of the Dean.

Subject to the superintendence, direction and control of the Director-Academics, the Deans shall, after taking such advice as necessary, decide upon the grievances of students regarding the enrolment, eligibility, migration, scholarships, research, studentships or fee-ships and terms of admission to University examinations

4.10 Academic Reforms

The quality of academics taught in colleges in all districts has been brought on a common platform with core subjects in the common syllabi formulated by the Boards of Studies at the University. But based on regional needs and the expertise available at different colleges, flexibility is offered in terms of elective subjects where the colleges can conduct choice based courses. This will give choice to the students to opt for specific subjects that they think will be more useful for their further growth or based on their own interest in studying the subject. The aim is to align the learning along the interest of the candidate.

Industry participation in curriculum development has been brought in by having Industry experts on Board of Studies and Advisory Committees of departments. The Teaching-Learning is designed around mini-project based activities for continuous assessment. The Teachers are sensitized to the changing learning styles and aspirations of fresh students in Three Week long Induction program before the start of the Academic session.

4.10.1 Choice based Credit System

The University has adopted Choice based Credit System with choice offered in terms of electives. The credit transfer between colleges as well as between Universities is envisaged and the Academic Council is entrusted with the responsibility of framing the rules of the transfer of credits when the student migrates from one University to another.

The students are provided additional platform to appear for remedial examination to just pass a subject if found difficult to study particular subject. E-Resources are being offered to train the students in addition to regular classes.

4.10.2 Three Weeks Induction Program of Freshers

AICTE has also started training programs for Induction Program for the teachers to make students interested in their subjects and profession. The Students' Projects are now mandatorily connected to local industry needs or societal needs.

4.10.3 Pedagogy and Training for faculty

Every newly appointed teacher will have to undergo total four to six weeks of training in pedagogy at the Teachers' Training Centre within a year of appointment. The emphasis shall be on new methodologies of teaching and learning, evaluation, and continuous assessment, time management, emotional intelligence, project management and financial management. The training may be in phases as it has to be applied and shall be backed up by some mentoring support from the Centre.

4.10.4 Mandatory Industrial Training and Industrial Projects in Final Year

There shall be compulsory industrial training after third year in collaboration with the industries and use of software's & mini projects for integrating skills in different subjects. An in plant training /internship of one month each after 4th semester and 6th semester, shall be mandatory for all students of Engineering. So shall be appearance of the final year students in the exit examination i.e. GATE, to gauge their standing in National Competition.

The final semester course structure of the University courses has been built to allow entire semester in the industry with concomitant assessment or execution of an industry problem based project at the college or appearing for the courses and papers in conventional manner. We expect the relevance of industry related learning should become an integral part of professional courses.

4.10.5 Academic Resources

Availability of adequately equipped laboratory is the main requirement of the departments and affiliated college. Each Institute should have well equipped/arranged labs, properly designed laboratory manuals which shall have to be updated at regular intervals with innovation at each step.

Colleges must be creating learning space in each Laboratory and provide access to scientifically customized Learning Resources in each discipline of Engineering. The Laboratory Practices in the colleges will be standardized across the State and transparency shall be maintained for documents between the teachers and students. The focus shall be on development of skills and competencies for solving real life problems.

4.10.6 Question Banks and Digital Assessment

The University has planned to maintain Question Banks for important subjects, to design balanced and errorless question papers, provide model solutions and conduct of online examinations. The question papers shall be profiled for Bloom's philosophy and verified for assessing usefulness for diversified programs. Minimum 40% passing % in individual headings of Continuous Assessment and Final semester examination are implemented to maintain quality of university education.

The evaluation system has already gone digital and result processing will be faster with complete transparency at all levels. The results can also be analyzed faster so that corrective steps can be taken without affecting the students. The remedial examination shall be an Online Examination for the benefit of students who fail repeatedly in particular subject so as to earn enough credit to move to the next semester.

4.10.7 State-wide University Information Management System

The Academic and Examination system is being converted into a State-wide University Information management System (UMIS) system so that all contacts between the stake holders will be through digital means. The financial transactions are already digital and cashless system has been deployed in the University. The Administration is also being converted into Digital Form through e-Office of NIC to bring in more transparency and accountability.

4.10.8 E-Learning

Lack of good quality of teachers is the bane of engineering education. To overcome, this limitation, establishing virtual learning centers at Main Centres and Regional centres has been included in the first phase of the University's expansion. Expert lectures and lectures of other colleges are planned in a two-way interactive manner. The lectures shall be relayed from studios at Regional centres to colleges through satellite linkages for benefit of the Students and teachers in remote colleges. The University shall involve itself with other universities in the network mode for digital learnings. The University has planned for online certificate courses through interactive mode and Career counseling sessions.

4.10.9 Skill Development Programs

The University has planned to offer credits to online Qualification Packages available through Skill Development Councils under National skill Development Council and National Qualification Packages

Framework to enhance the quality of teachers and graduates. The MOOCs will be used for some of the CBCS courses where the students will have choice of taking courses of their interests.

The academic program and assessment is designed to inculcate in students, self-study skills, presentation skills, information search skills, research abilities, knowledge sharing skills and defense skills, through participation in real challenges. The departments of the university and affiliated colleges are encouraged to create platform for placement through campus interviews, common pool campus recruitments and create equal opportunity for students and industries in urban as well as in rural areas.

4.10.10 Practices, Projects & Experiments,

It is envisaged to redefine the practical training just before going to the field. The laboratory will be revamped for experiment based learning's. The experiments shall also use affordable infrastructure for demonstration of scientific principles and make the students interested in projects.

The Colleges may keep records of the student's practical notebooks for a period of one year and destroy later after digitizing the data. The entire laboratory part should be turned into challenging learning experience. The departments must devise newer experiments and share the experience with others. There must be flexibility given to the teachers to create newer experiments and use them for case studies in class. There must be close correspondence between the theory taught in class and practical experiments designed in the laboratory. There shall be a depository of the newly designed experiments on the college web-page and in the University server. The students must be able to access them before coming to the class/laboratory.

At least one experiment must be open ended in the laboratory. The student shall be provided to work on one experiment setup and to design a new experiment using the same hardware or modifying it with additional input at moderate cost. Credit must be given to most innovative approach rather than just routinely conducting the experiments.

4.10.11 Short term projects

The engineering education should rely strongly on practicing what has been taught in theory. From second year onwards, the students must take interest in working on small projects, i.e. at least one project in each semester. The project may be conducted individually or in a group. For a group, the scope of every participant must be clearly defined and progress must be tracked. The group participant will submit their own evaluation of every other's contribution to create a matrix which ultimately shall assign the relative credit to individuals in the group.

The project may be related to the theory classes or it could be entirely new area. The newer techniques of simulation or use of computer software, preferably open wares, can be promoted for the students to work on their own. The work can be supervised to guide the students in newer areas. Molecular simulation, AutoDesk and Scilab or Python programming can be activities that the students can undertake as additional learning activities and later on relate them to core subjects that they study.

The project may be defined for longer time but success will depend on getting fruitful results at frequent intervals. The faculty teaching 'Chemistry' can be encouraged to teach the subject with programs like GROMACS and GAMESS to teach chemistry with visualization. The engineering graphics can be clubbed with AutoDesk training so that drawing and design can be done on computers. The IT students can be trained in web designs and data analytics in their early stages. EXTC and Electrical engineering students can take up designing and creating sensing elements and signal processing. The efforts can be put up to use mobiles and tablets to develop many of these small scale and preferably interdisciplinary projects. There needs to be at least 5% of the courses offered by the university would be cross-departmental /functional/ college courses as this is the demand and need from the industry.

4.10.12 Final year projects

The final year projects are usually hypothetical and may not find practical applications. These projects are to be designed as mini- research projects that can address problems that society is facing in general and industry in particular. A strong interaction with industry is needed to get industry perspective on the projects assigned to the students. The students can be encouraged to discuss with industry and define appropriately the problem. The project can draw attention of industry only if it has practical utility.

The University cannot remain oblivious to the needs of the society staying around it and so will be affiliated colleges. The faculty and students should identify the problems by conducting survey of the nearby regions for data on type of industry in the region, people staying in nearby towns, villages and checking on their needs that remain unfulfilled. The problems faced by the society and industry shall become opportunities for projects for the academia. Anyone with workable and affordable innovation should be promoted on competitive basis and supported by materials, funds and human resources alike.

4.10.13 Undergraduate Research and Innovation

The engineering students at various levels shall prove to be the future leaders and policy makers in the development sector. They have to be groomed by inculcating in them the innovative problem solving approach. The thrust areas for support of research at education levels need to be identified from time to time, in conformity with the national requirements. There should be a compulsory course / foundation course for all the university students on "learning how to learn"

4.10.14 Workshop and Maker's Lab

The workshop is where the engineering students should be working not only during the day but they must show willingness to work with their own hands if the university/college is willing to invest tin their efforts. The workshop facility can be built as supporting infrastructure for innovators to prepare prototypes. The workshop and Maker's lab must be equipped with all necessary equipments for preparing the first product. The workshop should be equipped with lathe machines, welding units, control systems and instruments that can be used to build any things afresh. The credit needs to be given to the innovators who create the products, prototypes and design systems.

The final year projects should be in open lab, accessible to the students for development of any new product, process or system.

4.10.15 Soft Skills Training

Most engineering students have difficulty in communication and interpersonal communications. Formal training is expected from each college or informal activities that can help the students to sharpen their communication skills. These activities require additional expenditure using external experts. The cost will have to shared by the students as major beneficiaries. By the time, the student reaches to final year, he/she must be fluent in at least one foreign language. English is the most common language but German, French, Japanese and Mandarin may be taught to the students.

The students must be taught team work, time management, financial management and emotional balance. These attributes enhance the employability of the students. There must be at least one area of expertise that the student must be able to claim. At the University, expertise in Chemical Process safety and Automation Technology are being planned because of proximity to Chemical Industry. At other places, expertise in other areas need to be built. We may want to integrate such developments with core courses and minimize add-on interventions.

4.10.16 Supervised Learning-

This is a new concept the University shall be experimenting with. A few courses will be offered in supervised learning mode in which a course faculty will act as supervisor. Students will learn the course through problem solving, field visit and carrying out projects. The course faculty will be responsible for conducting examinations, assigning projects and problems.

The classrooms should become cooperative learning experience. The students can access content on the internet and cluster around a concept to evaluate it. If the group has difficulty in grasping, it can approach second group. If the group can not find answers, they can approach the teacher who is supervising the entire exercise and pitch in with the explanation.

4.10.17 Flipped class room learning

Few courses will be assigned in flipped class room mode in which students will be asked to listen lectures at home and class room time will be utilized for more meaningful activities such as discussions, problem solving and application of theory. This approach may need a lot of hand holding from experts and the University to implement at college level.

4.10.18 Media classrooms

The classrooms can be equipped as media labs so that students can experiments on computers for better learning. The University auditorium can be turned into open learning space where a course can be beamed from Coursera, IEEE courses, MIT Open Courseware, NPTEL courses or Khan Academy lectures. These lectures, as specified by a time table, can be attended by the students who have taken those courses. With media labs, these can be shared with affiliated colleges simultaneously. This will make the network bandwidth free as only one connection shall be used. The same space can be used to project lectures of Nobel Laurates and other visitors to the University to all affiliated colleges.

The credits can be assigned to the courses taken online provided the tests are conducted in supervised conditions. The Departments and affiliated colleges can identify these courses as electives and offered to the students, even as audit courses. Once the lecture is projected, the students can revisit the course at their own time for further studies.

4.10.19 Technology oriented courses during vacation time.

Technology oriented courses from the domains of ICT, industry safety and regulation, entrepreneurship and automation will be offered as vacation courses to interested students. A special cell will be formed to organize such courses.

4.10.20 Making it mandatory requirement to complete at least one MOOC

Successful completion of at least one MOOC will be made as a mandatory requirement for awarding B. Tech and M. Tech. degrees. Students will be asked to enroll for free courses on Coursera/Edx/NPTEL/ACADS/SWAYAM.

4.10.21 Digital Media Lab

The Main Centre will build a digital media lab that shall record lectures in -TEDx format. Each lecture shall be for 15 minutes describing latest developments in the field. These videos shall be available on subscription to the students of all affiliated colleges. The revenue will be shared with the resource persons. The facility will be also used to streaming the lectures over internet to the seminars halls of the affiliated colleges. Extensive depository will be prepared of all project reports, lectures at several colleges and will be made available to students' community.

4.10.22 Student's Data Analysis,

The University has planned to have e-Governance using University Information Management System(UMIS). It is envisaged that information of each student, admitted to any affiliated college, shall be part of the UMIS. All the details of past academic record and current academic achievements will be logged into the UMIS and shall be accessible based on privileges of the account. The performance of students shall be evaluated college-wise, discipline-wise and region-wise. The analysis is likely to provide information on current trends of the input to the program as well as college-wise performance.

The progress of women candidates against men and that of socially disadvantaged groups against the other groups shall be tracked. This analysis should lead to redefining the syllabus and making available extra support that needs to be provided to these groups.

The data of students, particularly their availability in certain disciplines shall be mapped against need of the graduates in that discipline for industries throughout the State but keeping in mind that these graduates shall also be trained to meet the global demands of the skill.

4.11 e-Learning Activities

4.11.1 Deployment of Moodle as a Learning Management System

A university wide learning management i.e. Moodle (Open source LMS) system capable of storing course specific information such as students registered, results of quizzes, examinations, conducting online examinations, distributing assignments, online submission of assignments, storing online course material is to be deployed.

4.11.2 Adopting SWAYAM platform in credit courses

The AICTE and MHRD has given clear mandate to adopt the SWAYAM platform in offering choice based electives in the University's curricula. The University has already taken up steps to offer e-courses for its students. The affiliated colleges also have been instructed to adopt the courses from the SWAYAM platform.

4.11.3 To deploy Digital Content Repository:

A university-wide digital content repository is planned to deploy for archiving M. Tech. and PhD Dissertation and other scholarly articles published by university members with the aim to make it available in public domain. For this purpose, DSpace which is an open digital content repository will be used.

4.11.4 To increase student-teacher interaction through Piazza.

Piazza is a social networking platform which aims to increase the interactions among students and teachers. Teachers will be encouraged to create web-based course pages on Piazza for all the courses they conduct during the semester. The discussions on the academic content is already promoted at the University using Piazza which is monitored at the highest level in the University.

4.11.5 To modernize all class rooms for e-content delivery mode.

All the class rooms in the University will be equipped with video-recording and web streaming facility in phase wise manner. The lecture conducted at the University shall be video-streamed on the internet to the affiliated colleges and also stored in the e-depository for off line access at the University.

4.11.6 e-Attendance System

The system shall be developed for e-attendance system for automatic attendance recording by a biometric device and server to keep the record. The Board of Studies and Academic Council may take final call.

4.11.7 Finishing School Program

Most engineering graduates, despite sufficient training in technical subjects, have difficulty in communication. Particularly those coming from rural areas, face hurdles in communication with external world. For some, adequate level of technical knowledge or its application, is lacking. The Cell shall conduct remedial courses for such graduates at the Centre, in communication skill, interpersonal communication, financial management, short term subject domain courses for refreshing knowledge, etc.

Quality in Education

5 Quality in Education

5.7 Academic Audit

The National Assessment and Accreditation Council (NAAC), Bangalore, visited the University in April 2014. The peer team visited the University during 04 and 7 February, 2015 for its assessment. The University has been awarded B grade for its overall performance by the council. There is need to significant improvement in the academic functioning of the University. Insufficient number of the faculty is the most important factor. Also there is strong requirement of building research culture in the University Departments who are involved mostly in UG teaching which in turn can improve the quality of the education in the University and affiliated colleges.

The engineering education scene is dominated by a large number of affiliated colleges. There is a variation in the quality of education imparted in these colleges. It is imperative that the syllabi of the engineering disciplines have a common base throughout the State and electives can be added on the basis of need of the region and expertise available at the colleges with certain academic flexibility. The colleges will have to undergo performance based grading and academic audit shall have to part of the University system to maintain the quality of education imparted at these colleges.

Depending on the performance of these colleges, they will be considered for granting graded autonomy, which should be under a periodic review. The autonomous institutions can bring innovation in the education system. Already the new system of the University permits a very flexible system of offering elective courses from second year onwards.

We will have a robust Academic Audit system for every university department and affiliated colleges. The academic assessors themselves shall be trained first who shall audit the colleges for well defined parameters as per a published calendar and audit results shall be available on website of the University. The purpose of the audit is to identify areas of improvement and plan the developmental programs. At present, the Advisory Committee members audit the departments at the University. The Audit of the courses for the odd semester of 2016-17 has been completed.

The Academic Audit is a peer review process that involves self-study and then an audit visit by peer group from outside the Institution. The process emphasizes self-reflection and self-improvement rather than mere compliance with predetermined standards. The purpose of an academic audit is to encourage Institutes to evaluate the quality of 'Teaching-Learning processes" – the key activities required to continuously improve the quality of teaching and learning.

The academic audit framework covers activities and quality assurance processes which might be expected as fundamental in an institute of good standing. For each academic activity, Institutes should address not just whether they do undertake the activities or processes identified in the guiding framework, but also evaluate how well they do so, and on what evidence they base their own self-evaluation. From own self-evaluation, the Institutes must be able to identify the areas for improvement and develop strategies to address those concerns.

An audit begins with a process of self-review that the Institute uses to report on its progress towards achieving the goals and objectives of the audit. The audit panel verifies the self assessment through documentary evidence and interviews of stake holders during the site visit. An academic audit checks how the faculty in the institute organize their work to approach educational decisions and how they, using

the resources available to them and working together, provide a quality education in the best interests of the discipline and students. The final audit report shall be made public on the website of the Institute and of University. The report has to appreciate good practices which can be emulated by other Institutes and make recommendations to assist the Institute in continuous improvement.

In the following year, a report on progress in implementing the recommendations of the previous audit forms a part of the self-review process. Unless otherwise stated, all activities and processes relate to both postgraduate as well as undergraduate programs of studies and it is assumed that processes discussed apply to all students similarly.

5.8 Accreditation- NAAC/ NBA/ NIRF

The University's academic activities are subjected to regulatory compliance by bodies at the National level, such as NAAC, AICTE, NBA and from the last year by NIRF. It is expected that all Degree courses at UG and PG levels at the University be accredited by the NBA and the University be accredited by NAAC. At present, the University is having Accreditation with B grade by NAAC while pre-qualifiers have been filed with NBA for all UG courses in 2016. The University shall insist on the affiliated colleges also for getting their courses accredited from NBA or other competent authorities such as Pharmacy Council of India and Council of Architecture. Typically within the first two years of affiliation, if the course is eligible for applying for the NBA accreditation, the college must apply for the same.

The main problem anticipated with NBA accreditation is the shortage of faculty at UG degree courses. For the PG level courses, there are no faculty positions approved by the State Government. The situation must be the same in all engineering colleges.

The University manages the shortage of the faculty by hiring ad-hoc faculty every year for a period of one year. Against all vacant positions, ad-hoc faculty are appointed by following standard procedure of appointing ad-hoc/ contract faculty members with necessary qualification. For NBA accreditation, the ad-hoc faculty members appointed by the University Departments and Affiliated colleges will have to approved by the University through its Academic Council. Since the ad-hoc faculty members are appointed at the beginning of the academic year, the University shall hold the Academic council meeting within the first month of the starting the academic session and approve the ad-hoc appointments made by the colleges by following UGC prescribed process for a period of appointment, if eligible. The colleges will have to send the details of the appointed ad-hoc faculty every year well in advance for approval. A university representative or nominee of vice-chancellor shall be co-chairman of the selection committee at the college to facilitate such requirement of approval.

There is strong need to analyze the criteria itself for NBA accreditation. There is distinction made by the NBA accreditation by separating UG and PG teachers. As such, most faculty members have MTech or PhD qualifications and thus each faculty member having sufficient number of years of teaching experience may be allowed to teach and guide MTech students.

An online mechanism is planned to develop for monitoring and evaluation of NBA/NACC parameters. A database will be prepared with respect to these parameters and semester-wise evaluation will performed to identify the areas for improvement.

5.9 Courses Offered at a Glance at the University

Currently the University offers the following courses. However, considering the scope of the Technical Education we will have to establish more Departments and start newer courses. We might need to consolidate some of the programs by merging the Departments. For example, Chemical and Petrochemical Engineering Departments can be merged to form a bigger department. Computer and Information Technology Departments also should be clubbed into a single Department.

5.9.1B. Tech. Courses

Sr.No.	Name of the Course	Admission capacity	Duration in years	Year of starting
01	Petrochemical Engineering	60	04	1989
02.	Mechanical Engineering	60	04	1993
03.	Chemical Engineering	60	04	1993
04.	Computer Engineering	60	04	1995
05.	Electronics & Telecommunication Engineering	120	04	1995
06.	Electrical Engineering	60	04	1995
07.	Information Technology	60	04	2001
08.	Civil Engineering	60	04	2008

5.9.2M. Tech Courses

Sr. No.	Name of the Course	Admission capacity	Duration in years	Year of starting
01	Chemical Engineering	18	02	2001
02.	Computer Engineering	18	02	2001
03.	Electronics & Telecommunication Engineering	18	02	2001
04.	Environmental Engineering	18	02	2002
05.	Manufacturing Engineering	18	02	2002
06.	Thermal & Fluids Engineering	18	02	2003
07.	Power System Engineering	18	02	2008

5.9.3Diploma

Sr. No.	Name of the Course	Admission capacity	Duration in year	Year of starting
01	Chemical Engineering	60	03	1982
02.	Petrochemical Engineering	60	03	1993
03.	Polymer & Plastic Engineering	60	03	1993
04.	Instrumentation Engineering	60	03	1994
05.	Computer Engineering	120	03	1995
06.	Electrical Engineering	60	03	1995
07.	Electronics & Telecommunication Engineering	60	03	1995
08.	Information Technology	60	03	2001

5.9.4Advanced Diploma

Sr. No.	Name of the Course	Admission Capacity	Duration in years	Year of starting
01	Advanced Diploma in Water Quality Management	20	1 ½	1998

5.10 New Courses

The University has planned to start new programs over the next 5-10 years covering new disciplines or new developments in Engineering and Technology. The Proposed New Courses are

5.10.1 B. Tech. Courses

Sr. No.	Name of the Course	Admission capacity	Duration in years	Year of starting
01	Instrumentation Engineering	60	04	proposed
02	Polymer and Composite Engineering	60	04	proposed
03	Bio-Medical Engineering	60	04	proposed
04	Automobile Engineering	60	04	proposed
05	Food Engineering	60	04	proposed
06	Product Design Engineering	60	04	proposed

5.10.2 M. Tech Courses

Sr. No.	Name of the Course	Admission capacity	Duration in years	Year of starting
01	Instrumentation Engineering	18	02	proposed
02.	Polymer and Composite Engineering	18	02	proposed
03.	Bio-Medical Engineering	18	02	proposed
04.	Automobile Engineering	18	02	proposed
05.	Food Engineering	18	02	proposed
06.	Interdisciplinary Science Technology	18	02	proposed
07.	Product Design	18	02	proposed
08	Civil Engineering	18	02	proposed

5.10.3 Other Master's Courses

Sr. No.	Name of the Course	Admission capacity	Duration in years	Year of starting
01	Pharmacy	18	02	proposed
02.	Chemical Process Safety	18	02	proposed
03.	Architecture	18	02	proposed
04.	Hotel Management and Catering Technology	18	02	proposed
05.	Engineering Mathematics	18	02	proposed
06.	Industrial Chemistry	18	02	proposed
07.	BioPhysics	18	02	proposed

The additional courses can be started only after the State Government approves corresponding faculty positions and the University is in a position to sustain these courses on self-supporting basis.

Examination System and Assessment

6 Examination System and Assessments

6.7 Board of Examination

The Board of Examination of the University will consist of the following members

1. The Vice-Chancellor - Chairperson;
2. The Pro-Vice-Chancellor; if present
3. The Deans of Faculties;
4. Jt. Directors-Examination for Main campus and all Centres
5. Two Principals nominated by the Executive Council;
6. One Professor of the university departments, to be nominated by the Executive Council;
7. One expert in the field of evaluation in computerized environment, nominated by the Vice-Chancellor;
8. Director of Higher and Technical Education or his nominee not below the rank of Joint Director;
9. Director, Academics & Examinations - Member- Secretary

The Board will have the major responsibility of smooth conduct of examination and declaration of results in time and addressing the grievances of the students related to the examination. The Board shall be supported by Regional Sub-Boards of Examinations.

6.8 Examination System Reforms

The University is planning uniform syllabus across the state for core subjects of ALL engineering disciplines and, therefore, a common examination for all affiliated colleges in the entire state. The primary role of the Main Centre then will be to ensure that all examinations are conducted in prescribed manner. Also the colleges have been given academic flexibility of offering electives depending upon the expertise available at the colleges for wider choice of subjects to the students. The quality of these courses and their examinations, which are specific to the regional colleges, will be monitored by the Director from the Regional Centre.

The examinations will be conducted by the Jt. Director at Regional Centres and by Dy. Director at the sub-regional Centres, at the designated examination centres. The answer-books from examination centres shall be brought to the Centre(s) where they shall be bar coded and scanned for Digital Evaluation and sent to Common Assessment Program Centres at designated locations throughout State with requisite infrastructure for online evaluation.

The system is designed to maintain complete secrecy of identity of the candidate as well as that of examiner. The Regional Centre in coordination with Main Examination Centre shall complete the evaluation process in 30 days. The marks sheets can be distributed from the regional Centre to concerned colleges.

The University is planning to allow the unsuccessful candidates to appear for a remedial online examination within 28 days of the declaration of results to pass the subject. Only successful candidates will get the pass grade to avoid year loss. However, candidates who will be unsuccessful in the remedial

examination also can appear only in the following year for the same subject. Candidates with pass grade and interested in improving the grade will have to appear for the regular end-semester examination.

In general, we have provided significant academic autonomy at college level in terms of continuous assessment, and mid-term examination and elective from third semester onwards under broad guidelines of the university, supported by a strong audit process. The curriculum for specific electives will be prepared by the experts at the college and get it approved through Board of Studies and Academic Council. The colleges with consistent record of maintaining academic excellence shall be given academic autonomy under the UGC regulations. Colleges already having academic autonomy from earlier University shall continue to be autonomous but will have to follow the broad framework policies defined by the University in content delivery, evaluation and assessment and defining course structure.

6.8.1Continuous Assessment

The continuous assessment will be conducted by the teacher that he/she teaches throughout the semester after declaring the mode of assessment at the beginning of the semester and it must be visible on the College website for the knowledge of all stake holders. The marks must be sent to the University before Mid-Term examination and final semester examination online. The teacher and the management shall be responsible for timely submission of the CA marks to the University portal. Candidate cannot appear for the Mid-Term and final semester examinations without fulfilling attendance and CA assessment.

6.8.2Mid-Term examination

The management of the college shall conduct the Mid-Term examination at its own premises and using the faculty in respective subjects. The papers must be evaluated by the concerned faculty in a week's time. After the papers are evaluated the corrected answer books must be shown to the candidates and corrections made if necessary. The marks of the Mid-term examination must be uploaded by the management of the college on the University's portal in two weeks of the examination. In order to bring uniformity in the evaluation and grading, the Mid-Term examination may be set up by the Regional/ sub-regional centre and examination maybe conducted by the colleges as per pre-declared time table. The answer-books should be corrected by the faculty of college. The assessment shall be monitored by the Regional Jt. Director or Dy. Director-exam for quality. Colleges with consistent record of conducting assessment in error-free manner and keeping quality of students without inflating the marks shall be given authority of the conducting examination.

6.8.3End Semester Examination

The end-semester examination shall be conducted by the University as per time table declared well in advance. The examiners shall be appointed from a panel of examiners approved by the Academic Council for respective subjects. The papers or sections of papers can be designed by the panel individually or together. The three sets of the papers shall be set up for every subject in confidence. The Board of Examination with help of Director (examination) shall be responsible for conduct of the examination at designated Examination Centres. The Chief Conductor of the examinations at each examination centre shall receive the paper by electronic means 60 min in advance. The Centre in-charge shall be responsible for printing the paper and making copies of the same for distribution to the examinees.

In case of any untoward incidence of leakage of examination paper, the central examination board can set up fresh examination paper from the question bank and conduct the examination. The entire process can be made online to avoid human intervention.

6.8.4 Remedial Examination

It is unlikely that all students shall pass the examination in one go. There is small section of students who find it difficult to pass the examination. They have difficulty to clear the tests and many cannot cope with the pressure of expectations. Since the examinations are conducted only at the end of semesters, some of the students may lose out on the time and most importantly, they cannot concentrate on the next semester courses because of backlog. It is proposed that such students shall be given remedial examination which shall be conducted online in the form of objective type questions. With automatic screening of answers against the answer keys, the evaluation also will be done online. The students appearing for the remedial test and scoring minimum 40% in the test shall get pass grade in the subject. This will reduce substantially the number of students with backlog and ATKT. Those who cannot clear the remedial examination will have to appear the semester examination in the said subject a year later.

6.8.5 Supplementary Examination System

The students, who fail in one or more subjects in a semester, can appear for the supplementary examination just before the regular end semester examination to clear those subjects. The students who have cleared remedial examination and wish to upgrade their grade points also can appear in the supplementary examination.

6.8.6 Digital Evaluation System

The University has implemented an online digital evaluation system. Once the examination is over, the answer-books can be brought to the Regional Centre and scanned with utmost secrecy. The scanned papers shall be sent to designate 'Assessment Digital Centers'. The examiners shall be expected to assess the papers online and upload the marks at the same time. There will be complete secrecy on the candidates and the examiners.

6.8.7 External Examiners for Laboratory and Projects

For each laboratory examination, there may be involvement of outside examiners. The examiners can be called from other colleges in the vicinity. Each external examiner is expected to submit a confidential report on the laboratory examination separately to the University. The upkeep of experimental setup, innovativeness, and obsolescence of the experiments shall be informed to the University

6.8.8 Open examinations for B. Tech Projects.

B. Tech. project examinations will be conducted by organizing exhibition of projects and asking visitors to rate the project in addition to evaluating projects by expert examiners.

6.8.9 Quality of Evaluation

There needs to be strict monitoring of the question papers for quality. The papers shall be regularly checked for the repetitions, vagueness and weight ages. The faculty members may need training in designing questions, developing case studies, using internet resources for online assessment and evaluations, analysis of the results and data for developing more effective teaching methodology

We can bring in online course work for the students who fail again and again to teach them at their own pace. We may require professional counselors, who may assess suitability of the student for the course and if required counsel him to change the program. The digital depository of the University can be used to prepare them with practical projects so that they can earn their credits over time on their own. They can

accumulate credits for the courses by appearing for the online tests more frequently. Once the student earns 40% in the test, he should get the pass credit and promoted to the next level.

Online courses can be also opted for by the regular students as audit courses or where the students wish to get additional qualification. Minor degree can be offered to the students with online tests for online courses. The online course attendance shall be recorded whenever the student completes the modules and takes online tests.

The question bank for the on-line tests can be prepared and used as necessary. Enough data-bank must be prepared for the tests so that they do not become stereotype. The student cannot move on until he complete previous modules since mostly those modules will requires prerequisite knowledge

6.8.10 Revaluation of the answer book

The re-evaluation of answer books, if demanded by the students, shall be conducted online. The same examiner shall not be given the responsibility of reassessment. The Regional director (Students Grievances) shall be responsible for addressing the revaluation.

6.8.11 Deployment of and test various question paper generation algorithms

The Department of Computer Engineering of the University is currently developing various algorithms for generating question papers from the question bank which need to be tested and deployed. The objective is also to bring uniformity in the quality of question papers across courses in terms of Bloom's Taxonomy levels, minimal passing requirements and English presentation. The University plans to conduct on-demand tests to challenge students' higher-order thinking skills (HOTS) and specialized knowledge beyond regular semester examination.

Research and Development

7 Research and Development

As per the NAAC performance parameters, accountability of the university to its stakeholders should be in the form of higher order deliverables such as advancement of frontiers of knowledge, creation of developmental models and applications and being a catalyst for socio-economic development. The University has planned to develop research centres in different areas and training of faculty at the University has been already initiated. The University shall be promoting innovation, talent and creativity programs through project competitions at the State Level.

The Main campus shall have interdisciplinary schools/ Centres to accommodate research facilities. The faculty at these centres shall be recruited on highly competitive basis and only on the basis of the ability of the researchers to attract funding, either through government agencies or industries. The research output shall be tracked every year. Each regional centre also shall develop a few research facilities to be made available to faculty of colleges at nominal cost to recover the operating and maintenance costs

7.7 Entrepreneurship and Innovation

The University has planned to develop incubation centre and planned ideation and innovation activities for the entire State targeting all the student population. The University has conducted discussions with all sector specific skill development councils and has planned the training programs in the next three years. It is envisaged that with GoI funding at least 25 startups every year must be initiated in the next three years.

As the new affiliating technical university, the University has to plan its expansion in terms of infrastructure, ICT facilities, research and development labs, PG and Research centres and most importantly, adequate and qualified human resources. These plans cover the major functioning of the University in the next five , ten and 25 years of developments. Some of these plans are already put into actions.

The University aims to build on the talent of enthusiastic students to develop basic and applied research. The results of such developments should lead to applicable and affordable technologies that can address problems of society in the state as well in local industry. The research projects should reflect not only current trends in the industry but also future needs of the country. Worldwide the Universities combine their basic research output with engineering skills to build more sophisticated instruments. In India, majority of research establishments and universities import most of these instruments which are initially built in the University labs elsewhere. The University shall be at the forefront of building the prototypes on ' Make in India' principle to reduce the dependence on the imports.

The main campus shall have interdisciplinary schools/Centres to accommodate research facilities. The faculty at these centres shall be recruited on highly competitive basis and only on the basis of the ability of the researchers to attract funding, either through government agencies or industries. The research output shall be tracked every year. Each regional centre also shall develop a few research facilities to be made available to faculty of colleges at nominal cost to recover the operating and maintenance costs.

Networking with other Universities in the State and organizations elsewhere in the country will be promoted to advance the knowledge. We would like to give 'research experience' to undergraduates too to think on new ideas and work on them in research labs of the University without any fear. The young engineers and researchers shall be challenged to take problems to work on in Mission mode so that the systems will be built over a period. The trends in different disciplines of science and technology will be tracked to identify problems and newer areas for development and shared on the website for students to take up. TEDx type seminars and open bidding competitions shall be organized throughput the state to identify the talent of the students. Select projects can be supported through the research facilities at the main campus.

Being a Technological University, Dr. Babasaheb Ambedkar Technological University has a major mandate of developing not only human resources for the industry but the University should devote considerable time on technology development and engineering aspects for future development to match the emerging socio-economic growth needs in the country. Needs of both, Industry and Society should be focus of the R&D at the University. Also more PG and PhD level courses must be emphasized for knowledge generation for increasing demands of the current era. It is essential that we develop and support research activities that have local relevance but global reach. We need to invest heavily in our research infrastructure and improve our internal processes to attract the best talent to be a University at the forefront of the cutting edge research.

The continuation in the school shall be linked to performance in terms of funds generated, number of PhDs, research publications in indexed journals as API, interaction with industry and professional bodies, laurels brought to the University and of course quality of innovation in pedagogy

The Director (Research and development & Industry Relations) and his team at the University and at its Regional Centres should focus on emerging areas of application, levels of technological needs, possible contribution of affiliated colleges in deciding the pathways for R&D as well as for development.

The Director- Research and Development and Industry Relations, shall be responsible, with support from Jt. Director-Industry coordination for

- Promotion of research and technology development,
- Undergraduate and post-graduate research projects,
- Industry coordination and collaboration between the colleges under the University, and with other research and academic organizations,
- Transfer of technology,
- Maintenance of research quality in university departments and affiliated colleges,
- Coordination of resources for high quality research,
- Interaction with industry,
- Patents and other intellectual property matters,
- Extensional work and any other matter related to research and development in Technology and engineering.

The Directorate shall prepare a yearly document on technological needs and submitted to Planning and Monitoring Board and thereby the Executive Council for its consideration. The document should ascertain the status of new technological developments, financial needs and may advise the State government, Industries at local level as well as at the State level, and other stakeholders of possible fields of application and the methodology of application of such technology.

Students in the University and in the affiliated colleges are the great human resources. These young minds in the engineering and technology should be inspired through project support for undergraduate, postgraduate and research level students in engineering institutions as well as those who are conducting specially designed courses. Specific project support from concerned industries should be identified and tried for the students.

7.8 Research Schools and Centres

The University's perspective plan for the next five years included building the following Centres and Schools at the main campus. The Schools and Centres shall promote interdisciplinary culture with focus on PG courses and research. The appointments in the Schools shall be tenure based, initially for three years and subsequently five years, and performance linked. The faculty members in the Schools have to contribute to the growth of the School and Centres in terms of research projects, generation of funds from government agencies and industry.

We will have to demand strong research culture and effective leadership in every Department and affiliated colleges. We will have to establish performance based incentives to the faculty in all disciplines and celebrate excellence in innovation. We need to push boundaries of science and technology to be relevant.

The areas of research should be interdisciplinary. The Schools of the University shall provide access to research project teams of state of art research facilities, which the research teams have to contribute to during their stay in the Schools. We need to exchange knowledge with others where we do not have the expertise, to strengthen the activities of the Universities and affiliated colleges

The continuation in the school shall be linked to performance in terms of funds generated, number of PhDs, research publications in indexed journals as API, interaction with industry and professional bodies, laurels brought to the University and of course quality of innovation in pedagogy

The emphasis shall be on development of products, prototypes, processes and services that will have an immediate impact on the society and globally. The benefits of the research should reach to the local society in short term and to the state in longer terms.

The Schools shall have mandate of developing technologies for potable water, health care, and green energy at affordable cost, maintaining biodiversity and to improve the global competitiveness of the Indian economy with spirit of entrepreneurship in young engineers and technologists.

We'll also encourage research networks that bring together researchers to develop their common interests in a strategically significant research theme. Such networks will help build research communities, establish external presence at national and international presence and apply for funding.

We need to expand our post-graduate community and attract the best talent for post-graduate research, even from international sectors. We need to develop endowment funds to award scholarships that support out research priorities.

7.9 Technology Development

The Directorate of R&D should devote time on technology identification for future developments to match the emerging socio-economic needs in the country. Its interaction with the captains of the industry and entrepreneurs in continuous dialogue is an essential part of the University to discuss the emerging technology needs and at least one meeting in a year should be devoted exclusively for discussing and determining the emerging knowledge with industry organizations such as FICCI and DICCI. There can be development of a White Paper with the assistance of knowledgeable persons in their respective areas.

The University shall strive to strengthen the Industry linkages with its Curriculum Development and Teachers' Training Centre to take up major R&D projects in product and process development and in other industrial and socioeconomic applications. R&D Centres should also be established at Regional and sub-regional Centres. Besides strengthening R&D capability, efforts should also be made to support

collaborative R&D activities in other technical institutions which are, at present, at the forefront of providing cutting edge technologies

The University shall initiate R&D programme at B.Tech, M.Tech and Ph.D levels, under guidance of faculty members, to pursue their innovative research projects. Financial support for the same may be provided, but at a limited level and on highly competitive basis. Only the best can win the race. The University shall make strong case to access government funds and to channel them to its programmes to induct engineering students on the innovative path.

7.10 Entrepreneurship and Innovation Cell

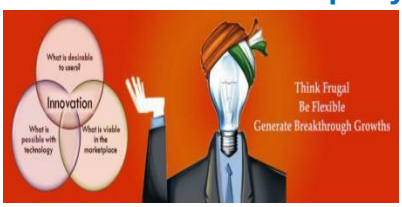
This decade has been declared by the President of India as the decade of innovation with a focus on inclusive growth. The 12th Five Year Plan had identified three distinctions of the emerging Indian approach to innovation. First, finding affordable solutions should be the focus for the needs of people, i.e. for health, water, energy and transport, without compromising quality. Secondly, the desired outcomes are produced by innovations in organizational and process models that deliver to people the benefits of technologies developed in scientific laboratories. Thirdly, there are innovations in the process of innovation itself to reduce the cost of developing the innovations.

While the emphasis is laid on current needs at ground level, it is also necessary that research in emerging areas of engineering and technology is also pursued with the ultimate aim of sustainable development. This can be executed by accessing funds from various agencies, including international funding agencies, and fully utilizing technical manpower. The University shall develop a Policy Framework for the Approach to Research, Development and Innovation. The R&D directorate shall also develop a framework for collaboration with and accessing funds from national and international institutions/ organizations. The University should be able to develop futuristic vision for the role of engineering in development of the state by brain-storming of its highest talent in a time frame coinciding with international and national targets. A 'Vision-2025' document may be prepared to present a Road Map for growth of engineering education and application leading to national and international socioeconomic development that is inclusive.

The Innovation Cell shall promote entrepreneurship and innovation by appropriate workshops using expertise of the University faculty. Regular sessions will be held with investors, entrepreneurs, businessmen, management experts and innovators. The Cell's program should be self-supporting with funding generated from industry.

The Cell may also conduct region-wise and statewide Innovation Challenges where the problems faced by the industry can be taken as challenge by the teams. The winning team shall be supported by the industry, posing the problem, to take up the solution for successful implementation. The IPRs shall be appropriately protected for innovative solutions. The emphasis will be on ideation to generate ideas and making products with own hands as marketable product, process and system.

7.11 Intellectual Property Rights Cell (IPRC)



The University should be involved in research, innovation, design, development, and dissemination of technologies, processes, and products. In view of this and considering the importance of formally protecting the intellectual property of the teachers, staff and students, it is necessary to have institutional arrangement.

The purpose of the IPRC is to:

- Facilitate, encourage, promote and safeguard scientific inquiry, research pursuits and the academic freedom of its faculty, researchers and students.
- Provide a clear understanding of the rights and responsibilities of the faculty staff, and students to protect their research work.
- Create an Innovative culture which fosters the creation and development of IPR at the Institute.
- Establish an IPR management policy and procedural guidelines for converting the knowledge generated to wealth.
- Enable the Institute to make beneficial use of intellectual property (IPR) so as to confer maximum benefit to the inventors, the Institute and the society at large.
- Any other as required

7.11.1 Structure of IPR Cell

The cell shall have the following structure:

- Chairman: Vice-chancellor shall be the Chairman head of IPC
- Member secretary – Director or Dean of (R&D) who will be responsible for smooth functioning of the IPR Cell
- Members (Two): Heads of two departments from the University
- Members (Two): Professors / Associate Professors of the University
- Member (One): Professor from law school specialized in IPR or legal expert
- Members (Two): JRF / SRF research students

IPR Cell should have a provision to have an external attorney on call. If any other special member required e.g. – Institutional Animal Ethical Committee (IAEC), etc.

7.11.2 Objectives of the IPR Cell

The IPR cell aims to:

- Arrange for the speedy processing and filling of applications for patents and to effectively implement the policy and guidelines in respect of Intellectual Property Rights.
- Facilitate protection and valorization of intellectual properties generated by its faculty, staff and students as results or their intellectual and scientific pursuits at the University and affiliated colleges during the tenure of their employment/engagement at the University and thereby offer scope for wealth generation, alleviation of human sufferings and betterment of human life.
- Usher in prudent IP management practices in University so as to promote IPR awareness and culture among its faculty, staff and research students. And provide a comprehensive single window reference system for all IPR related issues.
- Proactively create an environment for generating new knowledge through research and innovations in the universities.

7.11.3 Responsibilities of the University toward IPR Cell

- The responsibility of the University is to make sure that the IPRC functions smoothly. The functions of the IPRC shall include but would not be limited to the following:
- The above mentioned members shall constitute the quorum of IPR Cell.
- Meeting: The meetings of IPRC shall be convened quarterly by the Member Secretary.
- Assigned Responsible Person: Minimum one assigned person shall be in IPRC office to operate it regularly. This person could be the Member Secretary, Dean R& D or any other person assigned the responsibility.
- Infrastructure: There shall be a separate space within the Universities for IPR Cell office; and for

Universities where technology transfer centers are established. IPRC will be established at those centers. The required minimum infrastructure for proper functioning of the IPRC shall be made available.

- IP Counseling: IP cell will counsel and interact with inventors of potential inventions / intellectual properties / products and assist them in identifying / assessing the IPR potentials.
- IP Management: Filing, maintaining and monitoring and managing of patents and coordination between attorneys, faculty inventor, and other authorities.
- IP Transactions: Advising, drafting and monitoring of all IPR related MOUs
- IP Policy Formulation: Framing of IP policy and amendments from time to time according to need. The IPRC shall lay down its own procedure for conduct of its works
- Promoting IP Awareness: The IPRC will undertake such measures which promote awareness of IP rights and strive to develop an IPR culture within.
- Assistance in Technology Transfer: The Cell shall handle transfer and licensing of all IP developed in the University and at the technology transfer centre.
- Reporting on IP Assets and IPR Management: IPRC will periodically submit reports on IP assets to the University for consideration and advice.
- The IPRC shall make any other IP related recommendations to the Vice-Chancellor.
- The University shall provide adequate support for smooth functioning of the IPR cell.
- IPRC shall act to redress any conflict, grievance regarding ownership of IP, processing of IP proposals, procedures adopted for implementation of IPR policy and interpretation of various clauses of IPR policy.
- Investigate the matters of violation / infringement of any intellectual property rights.
- IPRC shall approach funding agencies, venture capitalists etc. for funds for promotion of IPR activities, tie-up with organizations for filing, licensing / assigning of IPR on revenue sharing basis, to provide waivers and release of IPR to Inventor(s) and / or Third party(ies) within the framework of IPR policy.

Ideation and Open Innovation Initiative

8 Need for Ideation and Innovation: Make in India

In the recent years, the Honorable Prime Minister of India has been emphasizing on 'Make in India' particularly in strategic areas such as science and technology, health care, water management, energy generation and conservation, heavy industries and defense. The need to innovate is strongly felt only when either technology is denied to the country or an exorbitant price is asked for products or technology by the suppliers. It is never in the national interest to get adversely affected by the external limiting factors and self reliance is a must. On the other hand, the multinational companies are looking at the demographic advantage of the country not only as a huge market but also source of trained, English speaking manpower useful in their businesses or services or even to develop their technology.

Multinational companies like Xerox, IBM, P&G, General Mills, SABIC, Shell, Hindustan Unilever Ltd, Microsoft, Facebook, Google, Amazon, Accenture, etc., which are making India their second home, have been perusing open innovation aggressively in India. Indian companies like Tata, Mahindra & Mahindra, Future Group, Aditya Birla Group, Infosys and Biocon, among others are not far behind. Even home grown e-commerce companies, like Flipcart have developed a new economic systems through business innovations. Many of these companies are engaging with employees, vendors and customers to co-create.

Innovation is a key for economic prosperity of the country and we need to use the large human resource base we have in Universities and colleges. A paradigm shift can be brought in the learning processes in the higher education system if the youngsters at all levels are challenged with real life needs. If the risk involved in the innovation can be taken by the Government, then it is possible to spread the spirit of Innovation throughout the State's education system. If the Government can provide a stipend to appear for the UPSC examinations, then similar support can be provided to the graduates, post-graduates and researchers to create new prototypes or prepare import substitutes at much lower cost.

There is already a bigger shift in the making in India. Asia being now the focus of the world's attention because of its demographic dividend, it is now realized even by local companies that innovating continuously is the need in the time of severe competition in businesses or they will have to perish on onslaught of competition from elsewhere.

The reason why most of our bright minds run to other countries is because the environment in the country has not matured enough to support the innovation by the young graduates. There is no dearth of talent in the Indian population. Over the years, Indians, particularly of younger generation, have been becoming increasingly more aware of their intellectual capital in a global context. The advances in telecommunication and improved connectivity are providing insight to the population into the markets, identifying the opportunities and making them to aspire for more and better standards of living. What is still missing is a support system which allows the individual to grow and even take chances with failures to rise again to try one more time.

There is a huge opportunity lining up for Indian innovators both globally and locally. And the innovators who open up to the collaborative innovation will find themselves rewarded both intellectually and monetarily.

It is proposed that through the Component 8 of Research and Innovation of RUSA, we open up the world of Open Innovation to the huge mass of youngsters in the State Universities and affiliated colleges who could be looking for opportunities to test and augment their skills in select areas.

If we can reach to every college of the State University, we can develop unimaginable number of ideas and correspondingly large numbers of opportunities, on which the innovators can work, develop prototypes of products, imagine newer services, and create new systems. Every problem faced by an individual in daily life can form a basis for an idea but we need to prepare the minds for the innovation. We need motivators in the higher education system that has access to latest technological advances in the field.

Unfortunately, the current system of functioning of the Universities is though robust on accounting can stifle the innovation and dampen the enthusiasm of the innovators. It is too rigid to allow anyone to fail in his/her attempt to do something different. The Innovation initiative has to be kept out of the academic rigidity and made voluntary participation of the participants. The University system's approach to innovation, therefore, has to be out of box, keeping the accountability of expenditure and trust on the abilities of the innovator as the main focus.

This initiative is well thought out in terms of planning and implementation at the large scale of the State, but has the potential of replication in the other states.

In the first stage a series of ideation workshops are planned at different locations by inviting participation of young students and faculty, if interested, to work on idea generation, and simultaneously exposing them to a variety of challenging problems in real world by direct interaction with local society and industry.

The ideas generated at the local level are to competitively evaluate at the University level for support to build prototypes and eventually at the State level for Start-up. The selection shall be based on merit of the idea/project and potential of generating employment. The emphasis shall be to generate the spirit of entrepreneurship in the young generation.

8.7 Plan of work, method and technique to be used

The project is conceptualized in a few stages as described below.

8.7.1 Ideation workshops

At the beginning of the program, it is proposed that awareness needs to be built in the students across all levels of the Universities. The college faculty and/or senior students shall be trained to conduct ideation workshops. The initiation shall be done by activity based workshop at select places in the Universities by bringing in resource persons with interests in working with the entrepreneurs.

In the first stage, the Colleges shall conduct the Ideation workshops at the college level using the same faculty and senior students. The colleges should be free to invite their own resource persons to appropriately train their students in ideation. These workshops are useful in sensitizing the student population for the basics of creativity, sources of information, exposure to different innovation product and interaction with innovators.

The colleges will have to draw strength from their own alumni, industry persons, and first generation entrepreneurs. They can form theme based clubs to discuss ideas and build networks with other Institutes, research organisations and trainers. It shall be impossible to cover everything in such workshops and this focused approach will have to be developed.

The exercises in the workshop are supposed to prepare these minds for the second stage of ideation. There may Innovation clubs at each college where the facilities of the colleges can be put to optimum use. It also means that colleges review their idle assets and make those facilities available to the students who develop bright ideas and have potential to become still bigger projects with appropriate input. The stress and support should be to develop something useful, no matter small or big.

The college may appoint one of its faculty members as coordinator of the Innovation club who should have interest in promoting innovation. But involvement of external experts with experience in innovation and startups shall be more useful.

The college will have to send at least five ideas to the University level where a panel of experts shall be selecting the best 5 ideas for the University. These ideas shall be supported by the State level Committee for developing the proof of concept or a prototype with necessary, by the second level of screening. The selection should be based on completeness and thoroughness of analysis, and most importantly on novelty and potential of generating employment in the State and not just to study aspects of physical phenomena.

Once selected, the teams shall be given funding and a deadline to submit the proof of concept with specified time period. The funding should be linked to the progress of the project and should be freed from typical government bureaucracy procedures but accountability with the colleges for efficient and optimum use of the financial support. The procurement may be facilitated by a Government appointed committee every week or two weeks. This is most crucial aspects of an Innovation Projects. The commercial aspects of the project must be in-built in the deliverables of these projects. The team must be made aware of the final applications to address problem faced by the society or improve competitiveness of the industry.

The next progress will be at the state Level. The project outcomes from the previous stage in all State Universities will be competing at the State level for funding for start-up. At the this stage, funding can be sought from industry, and Central bodies also to support good start-up ideas that will develop new industry or businesses in the State. The criteria at the stage should be highly competitive, thorough understanding of commercial aspects of the projects, willingness to give time and efforts to build business and generate employment in two to five years. The State shall then all support in regulatory terms to develop these start-ups and provide necessary ecosystem in case of failures to start again.

8.8 Open Challenge problems

In this stage, the innovators will be challenged with problems to find workable and cost-effective solutions. These problems can be provided in an Open Bidding system. These are opportunities where the participants can bid for a problem of their choice from a list of problems suggested by experts in the area. A plenty of such problems can be found from daily personal as well professional lives.

A RUSA or DBATU web-portal will be created to define a set of problems which will be released at the state level at regular intervals. The web-portal will also have facility for registering for the problem. By registering on the portal, the team will be bidding for a specific problem and will be provided with necessary details of the problems, particularly the constraints on the solutions. Normally the team can bid only for one problem. It is the freedom of the participants to form a group with necessary skill sets to bid for a problem from a pool of problems, for solving and arrive at a solution in a given time frame. The college will have to conduct its own screening to select the best solution for nomination to the competition.

The select team can submit the solutions before a deadline to be eligible for scrutiny of the solution. To bring professionalism in the entire exercise, the time-lines can be strictly adhered to, in the same manner as the bidding in corporate sector.

The entries will be screened for the best solution(s). A structure of experts will be established who can be invited on professional basis to select a few potential solutions. Only the selected/short-listed teams will be called for the final presentations to the team of experts for winning the final bid. It is better not to select the second best in the process to bring real life experience to the innovation competition. If, however, the solutions are widely different, it may possible to get the second team on the board. If the solutions are similar, the one with more detailed approach may be selected to the next stage.

The final element of this competition is a chance to the winning team to take the solution to its logical end. If the participants can come with prototype or process or system already built-up, it will be an added advantage. The winning team can get the opportunity, by the way of funds to complete the product design. These teams will be mentored by experts to ensure successful completion of the products and possible commercialization.

8.9 Industry Defined Problems

The problems suggested as above can be defined by Industry. The involvement of the industry will be to bring in an additional and necessary dimension to the initiative.

The college teams will visit nearby industries and look for opportunity for problems. The problem may be identified by discussion with the Industries and offered to their own students as a challenge for workable solution in reasonable fixed time. The college may offer the problem on its own to their students or send it to the common pool to attract wider range of participation.

Most of these problems will need multidisciplinary input and team building will become essential. If the problem is identified and solved with workable and cost effective solution, the project will get funding from this initiative.

If any financial gain is accrued by the Industry by implantation of these solutions, the benefit must flow to the innovators. For incentivizing the faculty members for their participation in mentoring and facilitating the entire exercise, the faculty member shall be treated as an innovator of the team and should be beneficiary of financial gains if solution is commercialized by the industry. Most small scale or medium scale companies might not be able to provide funding immediately. In that case, the I&OI initiative can provide seed funding to the winning team to develop a proof of concept and show technical and economical viability.

8.10 Open Innovation

Once the students get experience of innovation in competition, the action now moves to their own environment to identify the new problems and find solutions. The team of innovators now can formulate their own problem(s) and work out a solution.

The I&OI initiative will invite nominations from different Universities for new ideas which will be scrutinized in confidential manner with experts who can decide the novelty of the project and provide the necessary funding to build the enterprise around the idea. Ideally, the numbers of such projects will not more than 25 in a year for the entire State and a cap of Rs. 20 Lakhs on funding to each enterprise.

The ideas may be generated by faculty, staff or any student on the campus. However, a major condition for providing the funding to support innovation is NOT to buy ready-made equipment or outsource the activity. It will also require mandatory participation of students as innovators and not as project staff. No stipend will be provided to the students as they will be party to the IP of the final project. The IP will be owned by the Institute with clear rules for benefits to the innovator(s).

The I&OI will provide a platform for supporting the most novel ideas and will provide funding for develop an enterprise around the idea, facilitating the access to facilities, bringing necessary skill sets, professional ideas and partnerships with individuals with complementary skills for making the product. The project teams will be mentored by individuals with impeccable record of professional integrity. These experts will be either provided with professional fees or they can become part of the team with their own skills. The experts will be drawn from different domains as needed by the project idea.

The funding provided to the startups in such a manner will be treated initially as grant-in-aid to the college but the enterprise built with the support will have a stake of the college as equity on the behalf of the

Government. The college will maintain a separate account for the project and provide necessary facilities to make the enterprise a success. The accounts and expenditure shall be open to inspection at any time to maintain accountability of the project.

It is hoped that the I&OI initiative will build a rich pool of innovators, a range of ideas, solutions for more realistic situations, improved industry interactions and Open Innovations leading to entrepreneurships. This will also ensure reducing the knowledge drain from the current level, improve self-reliance in terms of new technologies, new products or systems.

8.11 Expected Outcome

- The initiative is expected to provide all inclusive opportunity to every student of the State for becoming a willing partner to the process, for his/her growth as an individual and as professional
- It will train for the first time a large number of students of the state in ideation. At the first count we expect to generate at least 5000 workable ideas and corresponding number of business opportunities.
- The initiative will for the first time provide opportunities to large number of students in terms of competition in an open bidding manner. It expected number is 1% of students' population responding to the bidding call. It is a still large number considering student's population in the state
- The involvement of industry persons individually as well as of corporate will significantly increase interaction of the colleges with local industries. This shall begin a give & take relationship.
- The solutions offered by a large mass of student innovators may offer cost-effective solutions for local industry problems and improving local economy.
- The Universities and industry alike shall be able to identify talents, and competencies at local levels, in the younger generation.
- At the State level it will become easier to map the expertise at college and University levels
- The program shall be promoting team building, networking and entrepreneurships
- The initiative shall trigger wide spread innovation movement and departure from away from rigid education system and examination oriented assessment. Finally the performance counts.
- We might be able to retain talent within country that leads to economic prosperity
- The program shall have at least 50 start-ups in three years and corresponding employment generation.

University Industry Interaction

9 University–Industry Interaction

Being a technological university, the University cannot work in isolation from industry. The major issue of the employability of fresh graduates can be addressed if they are given an exposure to current practices in the industry. As per the AICTE and UGC recommendations, industry persons shall be involved in the curriculum development and industry training. Experts from industry shall be appointed as adjunct faculty members, on different bodies, and as examiners for final year projects. Interaction with local small, medium size industries is expected to provide opportunities to faculty and students alike.

The University has started working in close association with industry and industry experts. There will be MoUs with major and minor industries, and professional and industrial bodies such as CEI, FICCI, NASSCOM for technology development, students' internships, technology transfer, advisory roles, joint project and research supervision and most importantly for entrepreneurship and startups.

DBATU is located at remote location but closer to a chemical industry belt. Despite this proximity the University has not been able to develop synergistic relationship with the industries. The major cause seems to be very low visibility on the knowledge generation front. Most faculty members are involved in undergraduate teaching while no positions are sanctioned by the State Government for Master's program or PhD programs. As a result, there is no significant output on research front and subsequently no visibility on the industrial linkages. The University has initiated several activities so far which can be promoted at affiliated colleges too in similar or modified manner.

A major effort would be needed in this area through personal visits, invitation to seminars, holding joint conferences in the premises of the industry, running continuing education programmes in areas of industry's needs in collaboration with experts from educational institutions, industry as well as research laboratories, and honoring leaders of Industry on a regular basis.

9.7 Outreach Programmes

Every effort should be made to make industry, along with local governments, the partners in the activities of the University. The programme should also reflect the components providing inputs for the industries. Each Department of the University has an Advisory Committee consisting of three industry experts and three experts from academia. The presence of industry experts in the University bodies ensures their input in development of course curricula and revision of syllabus.

9.8 Recognize Industrial Leaders

The University shall recognize contribution of engineers through its various Centres by inviting eminent engineers on different committees. The alumni from the industry may also be mentioned for their contribution on Universities' website, publications and other awareness means. The AICTE has permitted involvement of industry experts as adjunct professors. The University as planned to induct at least one Adjunct Professor on the faculty of the departments by invitation.

9.9 Collaborative R&D Activities

The University is planning promotion of R&D at all levels to undertake collaborative research funded by government and other funding agencies. In the 12th Five Year Plan, the government is trying to encourage industries to contribute for R&D at the same level as that by the government. Part of the funding shall come from the collaborating industries.

The AICTE and UGC rules permit appointment of industry persons as Adjunct Faculty. About 20% of the sanctioned strength of the faculty can be used to appoint adjunct faculty from industry. They bring their experience on table and practical knowledge. The adjunct faculty also brings latest knowledge on the table for benefit of the teachers and students alike.

Each department shall offer a course jointly with an adjunct faculty from industry. The adjunct faculty will deliver 20 hr of lectures scheduled over at the most five visits to the campus. The remaining 16 hr of lectures will be delivered by host faculties. The host faculty will be responsible for making travel arrangements, providing local hospitalities and setting conducting examinations.

It is envisioned that the Director (R&D) and Director (Industry Relation) at the Regional and sub-regional Centres can facilitate interaction of the colleges with local industry. The regional centres can also survey the industries in local regions and elsewhere in the state and the country and suggest changes in the curricula and introduce newer courses. The problems of the Industry can be brought to colleges for solving them and bringing innovators and industry together in a more meaningful manner.

The local small and medium scale industries may not be able to have fully fledged laboratories and need to rely on the resources at the University and its regional centres. These developments can be done on partnership basis so that benefits gained by the industry can be shared with the colleges.

There must be meetings with industry persons to share their perspectives on the activities of the University and those affiliated colleges. The research outcome of colleges can be shared with industry under the confidentiality and if found suitable can be taken up for suitable technology developments and transfer. Regular lectures and seminars can be held at the regional Centres for exchange of information and dissemination of knowledge to the stake holder. Exhibitions can be held every year at the Centres of products and processes developed by the University and affiliated colleges, keeping them open to industry personnel. It should generate enough interest among the industry to take up the research output of the University.

9.10 Training of students in industry

It is necessary that the students take extended training in industry. Six-week training in industry after the sixth semester examination should be mandatory. They should pick up at least one industrially relevant project from their stint in the industry and work on it in the following semester to come up with a workable solution. If the solution is pitched to the same company, it is likely to get a better acceptance from the industry also.

If the colleges can opt for complete semester long industry training in the eighth semester, it can be brought in the University system as a practice. Instead of conducting the project in the college, the last semester can be on-job project by the student. However, the selection of the candidates for the training can be done in competitive manner.

The progress of the student however must be monitored on monthly basis by regular interaction with faculty members in colleges. The progress can be monitored for continuous assessment and final grading should be done in consultation with the industry experts from the same company.

Fortunately for the telecommunication discipline such as BSNL and MNTL provide the training for eight weeks on chargeable basis. Similarly, RCF provides training to Chemical and Petrochemical engineering students at a cost. These companies can be roped in for Faculty training too.

Center for Product Design & Innovation

10 The Need for Product Design

With the change in economic scenario and opening up of Indian economy to global markets and access to Indian market by global giants, competition is severe all over the world. Stakes are high in today's competitive global market. Only those products, which demonstrate indisputable quality while meeting regulatory standards, become successful. To succeed in such an environment, introducing new and innovative products has become essential.

Design refers to activities such as creating styling, look and feel, mechanical architecture, materials and processes, and engineering various components to make a product function. The products have to be designed to suit the users' needs. They must be friendly, affordable, appropriate, ecologically sound, environmentally friendly and visually pleasing and in addition suited for the competitive global marketplace. Development refers to the entire process of identifying market opportunity, creating a product to appeal to the identified market, and finally, testing, modifying and refining the product until it is ready for production.

Innovative, meaningful, ergonomic and marketable products with a lasting brand value can be produced by good design practices. In a highly competitive world, with rapidly changing technological landscape and shifting consumer demands, only products with creativity and imagination, capture and sustain consumer demand. The iPhone is a classic example what a beautifully designed functional product can do to consumer's appetite and build an economy that can surpass the GDP of small nations. Great products evolve over time through hours of research, analysis, design studies, engineering and prototyping efforts, and finally, testing, modifying, and re-testing until the design has been perfected.

With the whole product development system continuously shifting towards a user-centric approach, there is a tremendous need for innovative solutions. The advent of virtual reality in recent years has given rise to wide imagination to product design and it is possible to check the product in all its glory even before it is even produced. Understanding the environment in which the product has to work is equally important and can be easily simulated with technology.

The program of Product Design at the Centre aims to define the current product development sector along with a deep understanding on tools and techniques to bring in the change. In addition, the product so designed with all technological input, has to be tested in actual field and generate revenue. Innovation means transferring the product into market to generate the revenue on sustained basis. It has to withstand the pressures of time, consumer taste and evolve continuously with demands for different attributes.

10.7 Governing Bodies of the Centre for Product Design and Innovation

The Centre shall have an Advisory Board consisting of eminent academics, researchers, product designers and visual artists to guide efforts for scientific and technological projects and activities of the Centre.

The Advisory Board will be constituted by the DBATU in consultation with the Director of RUSA, who will be an ex-officio member of Committee. The Centre's activities shall be conducted by an Executive Committee.

10.7.1 Advisory Board:

The Advisory board shall be responsible for providing guidance on the key thrust areas of the activities and functioning of the Centre. The Board shall monitor and evaluate the performance of the Centre in terms of the impact of programs conducted by the center. The Advisory Board shall be chaired by Vice-Chancellor of the university and Director (R&D, Industry Relations) of the University shall be its Member Secretary. The composition of the Board shall be as follows.

Sr. No.	Name and Affiliation	Role
1	Hon. Vice-Chancellor	Chairman
2	Director, RUSA (or nominee)	Member
2	Industry Expert	Member
3	Industry Expert	Member
4	Industry Expert	Member
5	Industry Expert	Member
6	Academic Expert	Member
7	Academic Expert	Member
9	DTE Representative	Member
10	Director – R&D, Industry Relations	Member Secretary

The Board will meet at least four times during the year most preferably in the month of Jan, April, July, and October

10.1.2 Executive Committee

The Executive Committee shall be responsible for the overall operation and other functions

- To devise guidelines for the conduct of creativity programs,
- To prepare Annual calendar of workshops for ideation, product design and innovation training
- To approve rates for honorarium and TA/DA of experts invited for guidance
- To monitor infrastructure development and its maintenance
- To submit the proposals to funding organizations for prototypes and commercialization
- To interact with industries for product information

The Executive Committee shall be chaired by Director (R&D, Industry Relations). The composition of the Committee shall be as follows.

Sr. No	Name	Role
1	Director, R&D and Industry Relations	Chairman
2	Directors of Regional Centres	Members
3	One of Heads of the Departments of Electrical/Electronics/Computer/ IT disciplines	Member
4	One of Heads of the Departments of Civil/Mechanical/Chemical Engineering disciplines	Member
5	One of Heads of the Departments of Architecture programs	Member
6	One of Head of the Departments of Pharmacy programs	Member
7	One Expert from Financial Management	Member
8	Joint Director(Industry relations), Main Campus	Member Secretary

The faculty will be taken from University departments and affiliated colleges in cooperation mode. For development of a product, a multidisciplinary team is essential. Each member of the team is supposed to bring on table necessary expertise for building the product. It is unlikely that one individual will have the necessary skills in marketing, industrial design, mechanical and electronic engineering, manufacturing processes and materials, tool-making, packaging design, graphic art, and project management, just to name the primary areas of expertise. Development is normally done by a project team, and the team leader shall draw on talent in a variety of disciplines.

The Product Design and Innovation Centre shall promote collaborative research and educational initiatives on design and innovation. The Product design encourages students to develop innovative products and services through curricular and extra-curricular projects. The focus of the Centre is to develop innovations that have a strong impact both locally and globally. The Centre shall foster a multidisciplinary approach and support projects of an innovative nature and collaborate with globally acclaimed institutions.

The Centre shall be well equipped with necessary infrastructure for carrying out product development, prototype building from first principles and conducting research in different aspects of product design including creativity, human factors, biomechanics, safety, CAD, CAE, PLM and design collaboration. The workshop, studios and the laboratories at the Centre shall provide an excellent opportunity for the students to explore materials and media, model prototypes, experiment with concepts and test out their design solutions.

The Centre shall provide an ecosystem in product design and engineering as well as the research degrees in Product Design. The activities at the Centre shall aim at developing skills, knowledge and aptitude among students so that they can, through creative problem solving, bring about innovation in the product manufacturing industry, or develop more efficient processes or develop systems for optimized use of resources. The projects shall have a strong industry and social focus and follow a human-centric design philosophy.

The students shall be trained to approach product design from a holistic viewpoint integrating, in a balanced and harmonious manner, the industrial design and the engineering design perspectives to come up with products that are well engineered, aesthetic and ergonomic and with a better manufacturability.

The projects at the Centre shall involve needs analysis, conceptual design, simulation and functional prototype fabrication of a new product with full documentation at every stage. The societal responsibility of the designer is sensitized through different project works during the Programme. The activities will encourage the participants to develop new products that can be commercialized but more importantly, the students shall be encouraged to become entrepreneurs.

10.8 Activities at the Centre for Product Design and Innovation

- **Product Innovation and research:** Developing product specifications, important attributes, relative importance of individual attributes, Case studies
- **Idea generation techniques:** Identifying the user and the relative scenario, attitudes and scaling, questionnaire method, field study, observational method, brainstorming
- **Sketching:** Methods of visualizing the solution, basic sketching techniques. Different perspectives and views.
- **Model Making:** Ways of optimizing and analyzing 2d/ 3D visuals into a real time mock up model. Various mediums of model making. Choosing the right material. Color and texture. Model making equipment.
- **Aesthetics of Product Detailing: Modifying product appearance for aesthetics**
- **Prototype Design, development and Innovation**: Recent developments and technological advances in prototyping. Understanding and addressing the feasibility criteria. Market survey and data analysis

- **CAD/CAS:** Digital medium in product development. Latest software advances in 3D modeling and surfacing.
- **Design for Innovative Interactions** - IxD theory and applications
- **Product development as part of Corporate Strategy** - Ideas to products
- **Product Communications and Innovation**
- **Product Semantics**
- **Typography, Expressions and Creativity**
- **Human Centric Product Innovation**
- **Product Forms and Variations**

10.9 Main Thematic Areas

We envisage the following main thematic areas to nurture innovative ideas.

- Signal conditioning and Sensor Technology
- Data Management and Analytics
- Energy Harvesting, Storage
- Environment management
- Healthcare systems and Medical Devices
- Water management and Treatment systems
- IT systems and ITen Services
- Flexible electronics,
- Mechatronics-Robotics,
- Transport-Solar cars, Personal transport, Drones, Vehicles
- Frugal Engineering
- Modern agriculture practices
- Artificial intelligence based products
- Forensic and industrial processes.

The research ideas involving interdisciplinary components will be developed under these focus areas. Initially the Centre will focus on the above thematic areas, but in future the University will put in sustainable efforts to nurture innovative proposals received from students, teachers and industries in collaboration. The Centre will be instrumental in developing innovative ideas into prototypes. The University hopes that the Centre for Product Design and Innovation with its continuing effort will achieve the objective of promoting a culture of Innovation.

The University shall also start a Master's program in Product Design over the next two years with Centre's own building, if supported by the RUSA and also a PhD program.

In the Centre, it is proposed to have its own Workshop-cum-Maker's lab for Hands on training as well as for detailing and building prototypes, Design and Simulation Computer Centre for Simulation and Computer aided Design, Digital Media Laboratory for generating e-content generation training, Material Library for database on new materials, Rapid Prototyping facility equipped with FDM machine and 3D printer. The design training at the Centre shall focus on nurturing an attitude among the students toward problem solving in design and to face a wide range of challenges in real world.

The Centre shall encourage investigation into the conceptual and theoretical foundations of design process and methodologies and also in social and cultural influence on design of products and applications. A variety of areas such as perception and cognition, visual semantics, collaborative learning environments, ergonomic investigation, visual tradition, will be of interest for the Centre.

Once the Centre is established, networking with other thematic Centres within India as well as abroad can be promoted to get exposure to universal designs.

The Centre shall be equipped with a Workshop-cum-Maker's lab. The purpose is to train the teachers and students to develop prototypes themselves. The workshop is where the engineering faculty and students should be working and they must show willingness to work with their own hands if the university/college is ready to invest in their efforts. Once trained in operating some of the latest equipments, it is expected that the teachers, in particular, can subsequently train their students also for developing new products.

The Centre facility shall be available to all students who wish to develop prototypes, to provide a proof of concept and help in transferring technology for commercialization.

The workshop facility shall be built as supporting infrastructure for innovators to prepare prototypes. The workshop and Maker's lab must be equipped with all necessary equipments for preparing the prototype. The workshop should be equipped with lathe machines, CNC machines, microfab units, welding units, control systems and instruments that can be used to build any things afresh. The credit needs to be given to the innovators who create the products, prototypes and design systems.

The Rapid Prototyping Laboratory will be built with facilities for making physical objects directly from CAD models. The Laboratory will be equipped with FDM machines and 3-D printer. An Ergonomics Laboratory will be part of the Centre to conduct research in man-machine relationship and user-centered designs. A variety of products and machines can be evaluated for ergonomic design.

The Centre shall be equipped with Digital media lab(s) so that faculty can experiment on computers for design of new products. The Media Lab will be equipped with facilities for Interface, digital video, sound, editing and multimedia work with dual monitors and tablets for each of the terminals. The facilities and space shall be useful for design activities and to explore different media along with interactive design. The students can take up applications involving experimenting with multi-media and looking at different ways of interacting with products, media and services.

The Lab shall be equipped with high end computing facilities along with digitizing tablets, scanners, double monitors and software for audio mixing, video editing, 2D-3D dynamic image creations and most of the popular graphic applications.

The same facilities shall be used to building e-content for education. The digital media lab shall have facility to learn new animation tools, to prepare own presentations and videos and for editing different media. The lab also be used to attend lectures from speakers from all over the world, record lectures of experts that can be used for on-line training courses by teachers, and students alike.

The faculty members can prepare digital courses, provide background commentary, and make them available online to others at a nominal cost, in turn generating revenue for themselves.

Technology oriented courses from the domains of ICT, industry safety and regulations, data analytics, entrepreneurship and automation will be offered as vacation courses to faculty members interested in developing expertise in specific areas. A special cell will be formed to organize such courses.

The Media Lab shall house facilities for both 2D and 3D work. The facilities include working with Maya and Animo supported by large size scanners and digitizing tablets. A Clay Studio shall be built for generation and exploring different styles as a component of design education. The clay styling studio should be equipped with styling clay, tools and ovens to help generate alternatives for styling in products.

10.10 e-Resources

The library shall be stocked with books and design publications, and subscription to all major international design journals and magazines covering design, graphics, photography, cinema, type design, typography, graphic design, ergonomics, design management, product design, environment design, interaction design, etc. The resources shall include films, CD ROMs, video cassettes and DVD's.

The digital media lab shall also record lectures in TEDx format. Each lecture shall be for 15 minutes describing basic principles and latest developments in the field. These videos shall be available on subscription to the students of all affiliated colleges. The revenue will be shared with the resource persons. The facility will be also used to streaming the lectures over internet to the seminars halls of the affiliated colleges. Extensive depository will have to be prepared of all project reports, lectures at several colleges and will be made available to students' community.

The Centre will identify resource persons related to all the above areas from all over the country and prepare a panel. All the Centres and sub-centres will utilize the services of the resource persons from this panel. A suitable honorarium will be paid to these resource persons commensurate with their expertise.

The Infrastructure at Centre for Product Design and Innovation at Main Campus

It is proposed to house the Center in self-contained building with all state-of-the-art facilities and amenities. Their financial estimates (in lakhs) are given below:

Sr. No	Facility	Total Expected cost (in lakhs)	Year-wise Breakup		
			2017-18	2018-19	2019-20
1	**A G+1 structure of the Centre for Product Design and Innovation at main campus(1000 sqm area)**	**300**	**200**	**100**	**-**
2	Office of Director, Director's Secretariat	2.5	2.5	-	
3	Offices of Centre (Accounts/ Technical amenities)	2.5	2.5	0	
4	Reception lounge	0.5	0	0.5	
5	**Computer Centre with desktops and Server, and digital connectivity, printers, tablets and screens**	**75**	**50**	**25**	
6	High End Digital Media Room with Audio/Video recording facility, with editing software, and hardware	100	20	40	40
7	**Well equipped SMART Seminar Room with multimedia projection facility**	**1**	**1**	**2**	**1**
8	Library with e-resources, Simulation software: MIMICS software, 3Matics FEA Analysis software, Magics RP software, Digital Canvas, Labview, ORCAD, VR systems	100	50	50	-
9	**Discussion rooms, Cubicles for teams**	**10**	**5**	**5**	**-**
10	**Maker's Lab cum Workshop with manufacturing facilities** 3D Scanning system, FDM Rapid Prototyping machine, Polyjet Prototyping machine, NI data acquisition systems, Variety of Sensors, Clay Laboratory	100	50	30	20
11	**Offices for faculty/resource persons**	**5**	**2**	**2**	
12	Stores	10	6	2	2
13	Self-serving Kiosks for serving for meetings, vending machines	5	2	3	
14	Reprographic machines	5	5		-
	Sub Total	**721.5**	**396**	**259.5**	**63**
15	Manpower	189	60	63.0	66
16	Utilities	42	12	14	16
17	Materials and Consumables	60	20	20	20
18	Experts	30	10	10	10
	Total:	**1042.5**	**578**	**366.5**	**175**

- **Recurring Expenditure**

Sr. No	Personnel	Persons	No
1	Director		1
2	Office of Director	Sr. Clerk/Assistant to Director	1
3	Workshop/ Maker's laboratory	Senior Technical Assistant	1
4	Digital Media Laboratory	Programmer/ Editor/	1
5	Maintenance Team	Power & Electrical	1
		Mechanical/ Civil	1

Sr. No	Personnel	Persons	No
6	Computer Centre	System Analyst	1
		Network Engineer/Programmer	1
7	Reception of the Centre	Security personnel	3
8	Accounts of the Centre	Accountant	1
		Clerk	1
9	Service at the Centre	Attendant	2
10	Library- self served, with CCTV cameras	Assistants	2
	Approximate Expenditure on Manpower	Rs. 60 Lakhs per annum	
11	Utilities	Rs. 12 lakhs per annum	
12	Materials and Consumables	Rs. 20 lakhs per annum	
13	Services of Experts	Rs. 10 lakhs per annum	

Curriculum Development and Teachers' and Staff Training Center

11 Curriculum Development and Teacher's Training Centre

The backbone of the education system is the teachers. The University has planned a series of action points to raise the level of faculty in the University departments and affiliated colleges by conducting training programs for the faculty. They will be trained for capacity building for design and development of need based curricula and design and development of virtual resources. Regular faculty development program will be norm. The faculty members shall be trained for developing Joint Certification Programs with industry and other organizations and offer consultancy services. A separate Curriculum Development and Teacher's Training Centre shall be established at the Main Centre initially but later at each Regional Centre and Sub-Centre. Regular refresher workshops and Mandatory six week's Industry training every three years have been proposed for teachers.

A survey of faculty members across the State covering all Universities, had thrown up a few startling facts. Almost 82% of faculty admitted to have no experience in Industry or exposure to corporate sector. The lack of such experience and no involvement in active research make these faculty members to rely on whatever information is available in open literature. The University will have to develop an ecosystem where the faculty and industry personnel can interact and develop symbiotic relations. The industry can offer opportunity to faculty member to spend upto eight weeks at their workplace with stipend as an intern.

11.7 Curriculum Development & Teachers' Training Centre

"No nation can rise above the quality of its educational system and no educational system can rise above the quality of its teachers."

The above maxim aptly expresses the role of good quality teachers in building a nation. And good quality teachers would become available when there is an appropriate education and training mechanism for teachers in place. It is therefore necessary to pay adequate attention to teachers' training at all levels of education.

A brief review of training facilities for technical teachers in the country, at large, and in the state of Maharashtra, in particular, is presented here. The review leads to identifying gaps in the technical teachers' training system in the state of Maharashtra.

11.7.1 Technical Teachers' Training: Current Status

At present, the technical teachers' training needs in the country are addressed in different ways. Some of them are as follows:

- National Institutes for Technical Teachers' training and Research (NITTRs) are located at Bhopal, Chandigarh, Chennai and Kolkata. These institutes mostly cater to the needs of polytechnic teachers and are not adequate to meet the training needs of vast number of teachers from technical degree colleges in the country.
- UGC's Academic Staff Colleges (ASCs): There are 66 such colleges in the country. Except Academic Staff College at JNTU, Hyderabad, all other colleges mostly cater to the needs of non-technical

teachers.

- Continuing Education Programmes (CEPs) of IITs: Each IIT has its own CEP unit that conducts training programmes for industry and academia. However, the cost of the training is not affordable for the colleges and teachers only from TEQIP institutes are promoted to participate in these programmes.
- Summers schools, winter schools in subject domain and pedagogy which are organized off and on under the support of funding agencies such as AICTE, ISTE, BCUD, etc. But the number of teachers which are covered by way of such programmes is negligible considering the total population of technical teachers.

A survey conducted under Rashtriya Uchchatar Shiksha Abhiyan (RUSA) showed that a majority of college teachers in Engineering Institutes is having Master's degree or Bachelors' degree. Teachers without research experience disseminate information but have difficulty in knowledge generation. Most technical teachers, i.e. almost 82% of surveyed teachers in higher education sector, also have no exposure to industry or corporate practices. Lack of knowledge in current practices hinders the growth of the teachers as well as of the students taught by them.

In view of the large number of teachers in the need of training, and abysmally poor facilities for training of technical teachers almost all over the country including the state of Maharashtra, there is a huge gap between demand and supply of quality teachers. The quality of education can be improved only by providing timely and adequate training to the teachers. An exposure to real life problems shall train the trainers. Since students form transient population, they leave the system after getting the training but their training does not percolate to the teachers' community. It is therefore necessary that adequate training programs are developed for the teachers' themselves.

11.7.2 Teachers' Training Centre of DBATU

In view of the dire need for training of the teachers of its affiliated colleges, a special provision has been made in the above Act in the form of Section-44 for establishing a separate 'Centre'.

Section-44: Teachers' Training and Curriculum Design and Development Centre

1) The University may establish the Teacher's Training and Curriculum Design and Development Centre in the manner prescribed by Statutes.
2) The Curriculum Design and Development Centre shall be planning, designing, coordination, development and evaluation authority, for Curriculum and Teacher's Training, of the University.
3) It shall be the duty of the Curriculum Design and Development Centre
   (a) To develop the curriculum of various subjects in the sphere of technological education, keeping in view the overall priorities, perspectives and needs of the society and expectations from industry;
   (b) To develop Learning Resources for the University;
   (c) To take steps to identify the demands of society and expectations from industry and design the curriculum and training of students and teachers accordingly;
   (d) To develop methodology for training of teachers and to create training materials for the same;
   (e) To coordinate with and empower Regional centres and sub-centres for conducting Teacher's Training and such other training as directed by the University.
4) The Curriculum Design and Development Center shall be headed by a Joint Director of the University.

Thus, there is a clear-cut mandate for Dr. BATU to establish the above centre to cater to the training needs of teachers of its affiliated colleges. Besides, this Centre will also have additional responsibility of developing need-based and forward-looking curricula so as to cater to the entire State.

11.7.3 Organizational Structure of the Proposed Teachers' Training Centre (TTC)

Based on the Act, the University has prepared a 'Strategic Plan' that has been approved by its Executive Council. The Curriculum Development & Teachers' Training Centre (CD & TTC) will be headed by a Joint Director, who will be reporting to the Director (Academics). The Joint Director will be sitting in the CD & TTC located at the university's main campus.

As per Section 44(3)(e) of the Act, the CD & TTC will have regional centres and sub-centres which will cater to the training of teachers belonging to the respective regions. Further, these centres and sub-centres will also provide training to supporting staff (technical/non-technical) of affiliated colleges and polytechnics. On request, the training shall be also given to teachers of colleges affiliated to other Universities.

11.7.4 The Activities of the TTC

The main activities of the TTC will be training of teachers/supporting staff and design and development of curricula.

The Activities:

The training of teachers and supporting staff will be of following types:

- Subject domain based training
- Pedagogical training
- Research methodology
- Technology Enabled Learning (TEL)
- Management capacity development
- Training related to Academic Audit
- Industrial Training
- Curriculum Design Workshops/Meetings
- Development of Learning Resources (Animations, Videos, Spoken Tutorials, etc.)
- Training for supporting staff (technical/non-technical)

Training Need Analysis (TNA):

Each sub-centre will carry out Training Need Analysis (TNA) of teachers and supporting staff members in affiliated colleges in its jurisdiction and identify training needs of each teacher at the beginning of every academic year. Based on the TNA, the centre/sub-centre will design training programs and then publish its 'Training Calendar' at the beginning of every academic year and then conduct the training programmes as per the calendar. These training programmes will usually be of a duration form 1 week to 4 weeks. In exceptional cases they will be of six weeks.

The Resource Persons

The TTC will identify resource persons related to all the above areas from all over the country and prepare a panel. All the centres and sub-centres will usually utilize the services of the resource persons from this panel. A suitable honorarium will be paid to these resource persons commensurate with their expertise.

The resource persons may be regular or retired persons from academia, research laboratories, industry and profession. It may be noted here that many "Colleges of Education" in the country offering B.Ed./M.Ed. programmes have eminent faculty members who are experts in pedagogy. Such experts will be included while preparing the panel of resource persons. Sometimes, foreign experts may also be invited from time to time through MHRD schemes like GIAN.

11.7.5 Faculty Training in Industry

A survey of faculty members across the State covering all Universities, had thrown up a few startling facts. Almost 82% of faculty admitted to have no experience in Industry or exposed to corporate sector. The lack of such experience and no involvement in active research make these faculty members to rely on whatever information is available in open literature. However, the richness of actual experience cannot be captured by mere reading. It is necessary to provide avenues to the engineering faculty to have industrial experience at frequent intervals. The faculty also must spend six weeks every three years in the industry or corporate sector, learning the new secrets of the trade so that on return to class after the visit, the teacher shall have a wider perspective and better means of dealing with it. The Director (Industry Relations) at the University and its Centres should facilitate the training and subsequent monitoring for level playing.

The Director (industry Relations) of the University will have to develop an ecosystem where the faculty and industry personnel can interact and develop symbiotic relations. The industry can offer opportunity to faculty member to spend upto eight weeks at their workplace with stipend as an intern. They faculty member can accompany the students going to the same industry and work with the students on problems of the industry. The industry can take advantage of the students and their teachers on their premises to address problems that industry alone cannot solve. A fresh perspective can be brought by the faculty member if he/she has requisite expertise.

11.7.6 The Infrastructure at CD & TTC

Administrative Staff at the Main Campus shall be as detailed below:

Sr. No	Personnel	Persons	No
1	Jt. Director - (CD & TTC)		1
2	Specialized training cells	Coordinators-Associate Deans	3
3	Office of Jt. Director (CD & TTC)	Sr. Clerk	2
		Jr. Clerk cum Assistant to Jt. Director	3
		Programmer	2
4	Workshop/ Maker's laboratory	Senior Technical Assistant	2
5	Digital Media Laboratory	Programmer/Editor/	2
6	Maintenance Team	Power & Electrical	2
		Mechanical/Civil	2
7	Computer Centre/ Faculty Hostel	System Analyst	1
		Network Engineer/Programmer	1
8	Reception of the Centre	Security personnel	3
9	Accounts of the Centre	Accountant	1
		Clerk	1
10	Service at the Centre	Attendant	2
11	Library- self served, with CCTV	Assistants	2
12	Office of Faculty Hostel	Clerk cum data entry operator	1
		Assistants	2
		Security/Watchmen	3
13	Maintenance team	Electrician/Civil	2

Infrastructure

It is proposed to house the TTC and its regional centres and sub-centres in self-contained buildings with all state-of-the-art facilities and amenities. These buildings will contain following the facilities and amenities: Their financial estimates (in lakhs) are given below:

Sr. No	Facility	Expected cost	'16-'17	'17-'18	'18-'19	'19-'20
01	**A G+3 structure of the Training Centre at main campus**	**600**		**400**	**100**	**100**
2	Refurbishing Office of Jt. Director, Associate Deans and Director's Secretariat	100		50	25	25
3	Offices of Centre (Accounts/ Technical amenities)	10		5	3	2
4	Reception lounge	1		1	0	
5	**Computer Centre with 50 desktops and A server, and digital connectivity, printers**	**50**		**40**	**5**	**5**
6	High End Digital Media Room with Audio/Video recording facility	50		40	5	5
6	**Well equipped SMART Seminar Room (No.2) with multimedia projection facility**	**5**		**3**	**1**	**1**
7	Library with e-resources, Simulation software	50		25	10	15
8	**Furnishing Discussion rooms, Cubicles for team tutorials**	**17**		**10**	**2**	**5**
9	Maker's Lab cum Workshop	70		50	10	10
10	Advanced Automation Training Center	70		70	0	0
11	Chemical Process Safety Training Centre	275		100	100	75
12	Electronic Sector Skill development Training Center	180		100	80	
13	**Faculty Guest House**	**500**	**0**	**423**	**37**	**40**
14	**Offices for faculty/resource persons**	**10**		**5**	**1**	**4**
15	Stationary store	6		2	2	2
16	Kitchenette (self-serving)	6		2	2	2
17	Self-serving Kiosks for serving for meetings, Tea/Coffee/ cold drinks vending machines	20		10	5	5
18	Reprographic machines	7		5	1	1
19	**Solar Roof power generation**	**54**		**50**	**2**	**2**
	Total	**2081**	**0**	**1391**	**391**	**299**

11.7.7 Projected Capital Cost (in Lakhs) of over the next five (5) years for all Centres

Sr. No		2016-17	2017-18	2018-19	2019-20	2012-21
1	**CD & TTC at Main Campus**	**-**	**1391**	**391**	**299**	
2	**Building at Regional Centres**	-	-	-	-	-
2.1	Aurangabad	-	-	200	400	200
2.2	Mumbai/ Navi Mumbai	-	-	600	200	200
2.3	Nagpur	-	-	200	200	400
2.4	Pune	-	-	200	400	450
3	**Building Sub-regional Centres**	-	-	-	-	-
3.1	Amravati	-	-	100	200	300
3.2	Jalgaon	-	-	100	200	300
3.3	Kolhapur	-	-	100	200	300
3.4	Nanded	-	-	100	200	300
3.5	Solapur	-	-	100	200	300
Total		**0**	**1391**	**2091**	**2499**	**2750**

It is assumed that every newly recruited faculty member shall undergo at least one training program in one year. Also the training programs shall be counted for career advancement scheme

11.7.8 Projected Training Programs and corresponding Trained Teachers

Sr. No	Facility	2017-18		2018-19		2019-20		2020-21	
		No of colleges	Number of Teachers trained	No of colleges	Number of Teachers trained	No of colleges	Number of Teachers trained	No of colleges	Number of Teachers trained
1	Main Campus CD & TTC	0	300		300		300		300
2	Regional Centre								
2.1	Aurangabad	13	130	20	130	25	150	25	100
2.2	Mumbai/Navi Mumbai	0		10	100	20	150	50	150
2.3	Nagpur	6	60	12	60	16	100	20	100
2.4	Pune	3	30	10	30	20	100	50	150
3	Sub-regional Centres								
3.1	Amravati	2	20	5	20	10	50	20	100
3.2	Jalgaon	10	100	16	160	20	100	20	100
3.3	Kolhapur	12	120	16	120	20	100	20	100
3.4	Nanded	3	30	5	50	5	50	10	50
3.5	Solapur	3	30	6	60	5	60	10	50
	Total	**50**	**730**	**90**	**1030**	**140**	**1160**	**225**	**1200**

11.7.9 Budgetary Requirement

Thus, the funding for the TTC and its 9 Centres will have 'Recurring' and 'Non-Recurring' components as given below.

Recurring Costs	Non Recurring Cost
• Salary of administrative staff • Remuneration and TA/DA to the resource persons • Maintenance and depreciation of buildings and equipment, AMCs for equipment and wi-fi • Maintenance & upkeep of Computer Centre, Seminar Rooms & Library	• Construction of the buildings for TTC and its 9 centres • Procurement of state-of-the-art equipment/software/wi-fi facility • Library: Procurement of handbooks and reference books

11.7.10 Internal Revenue Generation

In the long run, all these centres are supposed to be run on self-supporting basis. In view of this, all the participants will be charged course fees to cover all the recurring expenses and also to create a surplus for expansion. The fees to be charged to the participants will be decided by the Finance Committee and Executive Council. It is expected that the each Centre shall be conducting twenty 5 days workshops in a year having maximum 25 participants in each workshop.

Typical Cost per Workshop (Rs. in lakhs)

Sr. No.	Particulars	Amount
1	No of Persons (25 Nos.)	
2	Refreshments/Tea/ Lunch/Dinner Rs. 500 @ per person per day	1.00
3	Resource Materials	1.00
4	Rental charges for Centre facilities per workshop	0.30
5	Resource persons (15 sessions per workshop @3000 per session)	0.50
6	Remuneration for Staff (maximum 3 Nos. per workshop)	0.10
7	Use of Laboratory facilities, if any, for practical training	0.50
8	TA /DA to resource persons	1.00
10	Miscellaneous expenses	0.10
11	Accommodation Charges@ Rs. 500/per day; Double sharing	0.64
Total (Rs. in lakhs)		**5.14**

The cost per person is Rs. 20560/- for a five days workshop. The charges can be fixed at Rs. 22000-25000 per person. At total 10 TTC, we must be able to cover 5000 teachers in a year. Sustainability requires attraction of the teachers to come back every 3 years training. Rental and accommodation charges shall generate Rs. 18.8 Lakhs revenue per year TTC also should be used for Industry Personnel charging Rs. 30000 - 40000 for a period of five days. This should be additional revenue for the University.

11.7.11 Estimated Expenditure for Specialized Training Programs spread over one to two semesters and Proficiency tests

Sr No	Special Training Programs with support from Industries and Skill Development Councils	No of participants In one course	Course fee per participant	No of Training programs	Expected cost
01	**Advanced Automation Technology**- The University has built basic infrastructure for training.	25	30000	5	37.5
02	**Chemical Process Safety**- (One week followed by Online training over two semesters) The University has signed an agreement with GEXCON, Norway and CCPS, USA for the training	25	30000	5	37.5
03	**Sector Specific Skill Development Programs** (about 150-160 hours) (One week training followed by online training over one to two semesters). The University has signed agreement with NASSCOM for Product Design and with Tata Technologies Ltd.				
	Manufacturing and Product Design	25	30000	5	37.5
	Electronics	25	30000	5	37.5
	IoT and ITenS, Data Analytics (with IBM)	25	30000	5	37.5
	SAP(150 hours)	25	60000	5	75
04	Number of Programs (10 in a year)			30	
05	**Total Number of faculty trained in a year in Specialty Areas**	**750**			
06	**Total Cost of Specialized Training**	**75**	**112.5**	**75**	**262.5**

We expect that the teachers participating in the program shall develop the following skills

- Academic Education: Ooutcome oriented content delivery
- Course objectives which promote higher order thinking skills such as Analysis, Synthesis, Evaluation and Creativityy
- Develop assessment tools for analysing the traits of the graduating students. There must be laid down quality assurance standards which need to be fulfilled.
- Cconceptualization of engineering models
- Design/ Development of solutions: Design solutions for complex engineering problems and design systems,
- Investigation of complex problems including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.
- Modern Tool Usage: Create, select and apply appropriate techniques, resource, and modern engineering tools including prediction and modelling, to complex engineering activities, with an understanding of the limitations.
- Individual and Team work: Function effectively as an individual and as a member or leader in diverse teams and in interdisciplinary settings
- Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation make effective presentations, and give and receive clear instructions.
- Demonstrate understanding of the societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering practice.
- Understand and commit to professional ethics and responsibilities and norms of engineering practice.
- Understand the impact of engineering solutions in a societal context and demonstrate knowledge of and need for sustainable development
- Demonstrate a knowledge and understanding of management and business practices, such as risk and change management, and understand their limitation.
- Recognize the need for, and have the ability to engage in independent and life-long learning

11.8 Staff Development

In order to implement the new pedagogy, digital evaluation and e-governance we need to develop training programs for the non-teaching staff at all levels. Regular programs will be conducted in skill development, communication skills. For the support staff and for training and placement officers of the institutes the following programs are envisaged

- People management
- Infrastructure/Resource Management
- Ownership and Relationship Building
- Self Improvement and Accountability
- skill Improvement and qualification improvement
- Time Management/ Stress management
- Quality and Audit of activities

Feedback from Stakeholders

12 Feedback from Stakeholders

A system of feedback will be developed addressing concerns of all stakeholders, students, alumni, faculty and industry. The feedback shall be analyzed regularly and the observations and analysis will be discussed in Academic Council for course corrections, if any.

12.7 Feedback from students:

The biggest contributor to the growth of the University shall come from the alumni. Their feedback as well as that from the current batches will be useful. The syllabus can be kept dynamic one where the faculty is empowered to initiate the course provided enough faculty is available. The Content of the course structure is also too much but electives from the second year to final year, can be designed to reduce the lecture load on the students as well as on faculty.

12.8 Feedback from teachers

It is also essential that feedback is obtained from the faculty members of all disciplines. The inclination of current generation is towards digital content. The faculty, if old, have difficulty in adjusting to the newer means of communication. Their needs must be balanced against the digital system. The course content must be developed with more practical content and students can be clustered for the learning processes.

12.9 Program Evaluation from Employers and Alumni

- Determination of base case of DABTU as on today in terms of perception of stakeholders, i.e. Students, Teachers, Staff, Alumni, Industry in particular and society in general. An online survey shall be conducted in the next three months for input. These will be analyzed to develop future modules of courses.

ICT Infrastructure Developments

13 Information and Communication Infrastructure Developments

We are in the era of Information Technology and Communication Technology. The recent developments in electronics, communication tools and big data analytics, with faster communication means have reduced the need to travel. At the same time, the data security, and its management have become important.

The University has decided to adopt the information and communication technology in its functioning in view of limited manpower at the disposal of the University. The University and Centres shall work through the e-Governance system and MIS with robust State-of-the-Art ICT infrastructure. The major value shall come from e-enabling all systems and processes to the maximum extent possible, from affiliations, examinations, fee, to college administration. Else it will not be possible to manage 500+ colleges and half a million students using physical resources.

The University will have a digital Portal for dissemination of knowledge among all the stake holders, and a MIS for e-governance. The Students, faculty, staff, and parents will have secure access system for getting information as and when required. The University plans to develop e-content for its own students which can be available for on-line distant education. The portal will also provide information about faculty members, their research contributions and available expertise for collaboration and tie-ups.

13.7 Information and Communication Technology Infrastructure Developments

The University is developing plans to enter into e-education system with development of e-content generation using its resources at the University and affiliated colleges. The content shall be made for enjoyable self-learning experience for anybody who wishes to learn. The portal will also allow Industries to post their challenges to youngsters and organizations looking for innovative solutions and ideas for new disciplines. Innovation shall be the key for the future developments at the University.

The University administration structure has the Directorate of Information and Communication Technology for e-Governance of the University. The Director at main campus shall oversee the entire ICT infrastructure of the University throughout the State. He shall be supported by Jt-Director(ICT) at regional centre and Dy. Director(ICT) at sub-regional centres.

13.7.1 The Functions of the ICT Directorate shall be

- Establishment and maintenance of ICT infrastructure for the University and regional centres and sub-regional centres
- Development and maintenance of State wide MIS system for affiliated colleges, university departments, for academic profiles of students and staff
- Tracking Teaching and learning processes and data analysis
- Maintenance of web related services for faculty, staff, students, alumni and industry
- Conduct of online examinations and evaluations
- Submission of data to regulatory bodies such AICTE, UGC, NIRF, MHRD etc
- Data analysis of examination results
- Development and maintenance of network communication within University and between the Centres

- Development of ICT systems for functioning of the University

13.7.2 Activities to be carried out under ICT

- Digitizing all activities of the Universities such as affiliation and publishing day-to-day activities to bring transparency in the administration.
- CCTV installation at University and all its Centers and Sub-Centers for distance monitoring
- Installation of facility for video conferencing for administrative meetings and reporting to Main Center
- Creation of virtual classrooms at Main Center and providing access to all affiliated institutes for seminars, webinars, STTPs, Workshops, Conferences
- Creation of e-storage for providing NPTEL video lectures, video lectures of faculties, notes, assignments, e-book and similar e-contents.
- Recording and editing rooms for creation of e-course contents by distinguish industry and academia experts
- Setting up server for maintaining students, staff and faculty database of University and all its affiliated institutes.
- Keeping the e-records of all affiliated institutes such programmes, intake, date of affiliation, NBA and NAAC details, results, placements, deficiencies.
- Development and time to time updation of website for issuing circulars, notices, rules and regulations, examination schedules, results
- Setting of cloud for sharing resources among the affiliated institutes.

13.8 ICT - Perspective Plan

13.8.1 Perspective plan for next one year:

- To develop campus wise intranet facility.
- To appoint department/section/centre wise coordinator for information gathering and upload on the intranet portal.
- To ensure that all the necessary and sufficient information about the various activities/ meetings etc must be available online.
- Digitization of day to day activity to create a paperless administration.
- To prepare the budget estimates for the establishment of data centres at each regional centre and sub regional centre.
- To provide secured login IDs to each stakeholders of this University (Lonere Campus) for access of information.
- To create, maintain and develop a curricular data repository for the student.

13.8.2 Perspective Plan for next five years:

- To establish and develop the 4 regional centres and Lonere campus ICT infrastructure.
- To establish and develop the sub regional centres of the University.
- To conduct workshops to create awareness about the use of the ICT among the conducted institutes faculty and students and other stake holders.
- Identification of key/ thrust area of University administration and digitize it.
- Up gradation and maintenance of data centres at campus of the University.
- To start a shot term industry oriented diploma on ICT and its Applications**.**

13.9 Funding Requirement:

- For 1st year: Rs 5 crores (to be explored from Government Agencies, and corpus fund/ revenue generated by the University centres and sub centers etc.)
- For 2nd year: Rs 10 crores to be explored from Government Agencies, and corpus fund/ revenue generated by the University centres and sub centers etc.)
- For 3rd year: Rs 5 crores (to be explored from Government Agencies, and corpus fund/ revenue generated by the University centres and sub centers etc.)
- For 4th year Rs 5 crores (to be explored from Government Agencies, and corpus fund/ revenue generated by the University centres and sub centers etc.)
- For 5th year: Rs 5 crores (to be explored from Government Agencies, and corpus fund/ revenue generated by the University centres and sub centers etc.)

13.10 Action Plan:

13.10.1 For 1st year:

Sr. No.	Activity	Target of completion
1.	To develop campus wise intranet facility.	Within next 3 months
2.	To appoint department/section/centre wise coordinator for information gathering and upload on the intranet portal.	Within next 3 months
3.	To ensure that all the necessary and sufficient information about the various activities/ meetings etc must be available online.	Within next 6 months
4.	Digitization of day to day activity to create a paperless administration.	Within next 12 months
5.	To provide secured login IDs to each stakeholders of this University (Lonere Campus) for access of information.	Within next 6 months
6.	To create, maintain and develop a curricular data repository for the student.	Within next 8 months

13.10.2 For next Five years:

Sr. No.	Activity	Target of completion
1.	To establish and develop the 4 regional centres and Lonere campus ICT infrastructure.	Within next 12 months
2.	To establish and develop the sub regional centres of the University.	Within next 15 years
3.	To conduct workshops to create awareness about the use of the ICT among the conducted institutes faculty and students and other stake holders.	Within next 2 years
4.	Identification of key/ thrust area of University administration and digitize it.	Within next 3 years
5.	Up gradation and maintenance of data centres at campus of the University	Within next 5 years
6.	To start a shot term industry oriented diploma on **ICT and its Applications.**	Within next 5 years

13.11 Requirement of IT infrastructure at various Regional Centres and Sub-Centres and Head office of the University

Sr. No.	Item	Qty	Approx. Rate	Approx. Cost
1.	Server (Rack Mount) Configuration • Processor – 2 x Gen9 E5-2620v4 FIO Kit 1 • RAM - 256 GB RAM, Minimum 24 DIMM Slot for 2 processor, Max 768GB Memory. • HDD - 2TB 6G SAS 7.2K 3.5in SC MDL HDD 3, 8 LFF HDD Bay upgradable up to 192 TB. • Maximum disk capacity of 192TB • Intel C610 chipset • Integrated 1GB Ethernet 4 Port (will not occupy any PCI Slot) • RAID controller with 2GB Cache • 9.5mm SATA DVD-RW Gen9 Kit 1 • 1GB Dedicated iLO remote • 5USB 2.0 Ports • 3 USB 3.0 Ports • Integrated MAtrox G200 Video. • 500W FS Plat HtPlgPwr Supply Kit 2 • With RHEL Operating system, keyboard, mouse, monitor	10	600,000/-	60,00,000/-
2.	Data Center Tentative Configuration • Rack Server12 • High Performance Blade Chasis1 • 2 way Blade servers with Dual Processors5 • Unified Storage Array solution with dual Active Controllers 1 • SAN Switch2 • Private Cloud Software Deployment Solution • Storage at least 20 TB with redundancy	1	180,00,000/-	180,00,000/-
3.	AC 2 ton capacity Split Type BEE Rating 5 Star	66	60,000/-	39,60,000/-
4.	Intelligent Systems (All in One Desktop PC) • Processor - Core i7 6th gen or better • Memory – 16Gb DDR4 • HDD – 1TB 7200 rpm • DVD RW • 19.5" HD Display • Wireless Network card • Bluetooth 3.0 or better • At least 4 USB ports 2.0 or better • Wireless Keyboard and Mouse • OS - Windows 10 Pro	250	65,000/-	1,62,50,000/-
5.	Networking Components • Manageable Switches • Firewall • Routers	11	9,00,000/-	1,00,00000/-
6.	Chiller Rack	11	3,00,000/-	3,300,000/-

Sr. No.	Item	Qty	Approx. Rate	Approx. Cost
7.	Online UPS at least 15 KVA with 3 hours backup	10	5,00,000/-	50,00000/-
8.	Furniture for Computers and Printers Tables	200	5,000/-	1,000,000/-
9	Multi Function Printers A3/A4	20	30,000/-	600000/-
10	Photocopier Machines with Computer interface	11	4,00,000/-	44,00000/-
11.	VSAT Installations for connectivity to all regional offices and head quarter	11	2,00,000/-	22,00000/-
12	PA system for Interactive Video conferencing With mike and necessary accessories	11	1,00,000/-	11,00,000/-
13	Video Conferencing	11	1,00,000/-	11,00,000/-
14	CCTV for all center	11	3,00,000/-	33,00,000/-
15	Recording Room or Studio	01		20,00,000/-
			Total	**8,89,60,000/-**

13.12 Action Plan for setting up ICT infrastructure

Activity	Duration	Action Plan
1. Digitizing all activities of the Universities such as affiliation and publishing day-to-day activities to bring transparency in the administration.	One Year : Oct 2016-Oct 2017	For affiliation it is proposed to have online interface application, document submission and verification and the status of application can be shown on individual login. For day to day activities, it is proposed to have biometric login system and publishing same on the website as well as on user login. Various application forms like leave application can be submitted and acknowledged through portal and a interface can be provided for complaints, discussion about administration. Minutes of various meeting conducted can be displayed online Procurement of required setup for digitization of all activities. Procurement includes servers, required software, scanners, printers, storage devices, ACs. Appointment of manpower includes Programmer, Network Engineer, and Data operators.
2. CCTV installation at University and all its Centers and Sub-Centers for distance monitoring	Main Center : One Year : Oct 2016-Oct 2017 Center and Sub-center : Five Years	University can monitor the activity of its centers and sub centers for various security and administrative purposes by installing CCTV in the respective places. Finalization of drawing for wiring layout and Installation of cameras, digital video recorders (DVRs), monitors and storage devices. Procurement of all these devices based on the above requirement for Main center.
3. Installation of facility for video conferencing for administrative meetings and reporting to Main Center	Two years	A special meeting/conference room can be can be build for conducting meetings between the university and centers and sub-centers for fast processing and smooth operations this can be done by installing PA systems and interactive displays with superfast internet connections Procurement of mikes, cameras, screens, control unit,

		leased line, speaker,
4. Creation of virtual classrooms at Main Center and providing access to all affiliated institutes for seminars, webinars, STTPs, Workshops, Conferences	Main Center : One Year Center and Sub-center : Five Years	To setup digital/virtual classroom thing for conducting distance learning seminars, webinars can be done by building classroom with PA systems, interactive displays and internet connectivity at each center. Audio-video systems, Multimedia board, white board, webcams, broadcast device. Audio video processing unit with trained operator.
5. Creation of e-storage for providing NPTEL video lectures, video lectures of faculties, notes, assignments, e-book and similar e-contents.	One Year	Procurement of server, storage device, intranet facilities.
6. Recording and editing rooms for creation of e-course contents by distinguish industry and academia experts	One Year	To provide the competitive edge and advance knowledge to students, University can develop the video content by various Industry and Academia Experts through talks, workshops and Seminar. For implementation of this we need recording room, with high end audio video processing tools/software with trained full time operator for the same
7. Setting up server for maintaining students, staff and faculty database of University and all its affiliated institutes.	Center and Sub-center : Five Years	Procurement of Server and storage device. Appointment of data operator.
8. Keeping the e-records of all affiliated institutes such programmes, intake, date of affiliation, NBA and NAAC details, results, placements, deficiencies.	One Year	For maintaining affiliation and accreditation related records it is required to have server, storage system and data operators.
9. Development and time to time updation of website for issuing circulars, notices, rules and regulations, examination schedules, results.	One Year	For the updating and circulation of notices it is required to have a chat interface between the faculties and staff. For this web development and management is needed.
10. Setting of cloud for sharing resources among the affiliated institutes.	Two Year	In order to facilitate sharing of resources and study material as well as online storage of content it is required to set up a cloud. This can be done by procuring a server and storing devices with cooling system.

Infrastructure Developments

14 Infrastructure Developments

The World Class universities have hall marks of abundant talent, flexible governance, supporting environment and team work. The University will have to travel miles to reach these milestones. The journey is difficult, if not impossible. The University has prepared a master plan to augment its infrastructure many old. Investing in the future excellence and diversity of research culture should be priority of the State Government at this stage. The University will also approach the industry and government agencies for additional support for research infrastructure.

The university will have to invest heavily in

- PG Laboratories
- Schools, Research Centre and Training Centre Buildings
- Research Infrastructure
- Regional and sub-Regional Centres
- Hostels and Refurbishment
- Staff residences
- Water management
- Solar energy generation
- Lecture theaters
- Seminar Halls
- Digital media classrooms
- Upgrades of laboratories
- Video-Conferencing systems
- High end Computational Facility
- Informal learning spaces for students
- ICT and e-Governance Systems
- Health Care Centre
- Community Shopping Centre
- Day-Care Centre
- Sports and Recreation Facilities
- Kendriya Vidyalaya (upto XII).
- Community Kaushal Kendra

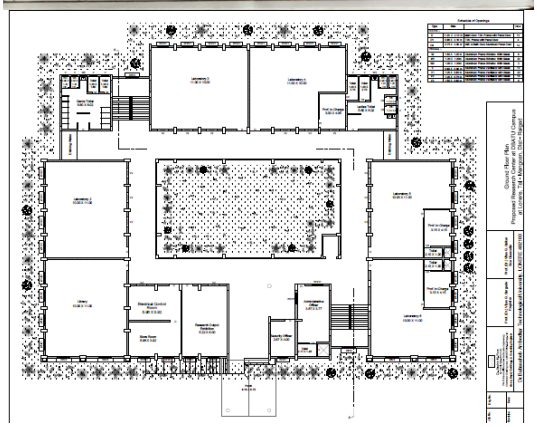
Our Administrative block has been awarded a prize for Architecture but the University lacks significantly in necessary infrastructure today in terms of the Academic blocks, faculty offices, Residences and Hostels, PG laboratories and Research Centres. Investments are, therefore, necessary to build the infrastructure that can attract the best talents.

We have to attract academically talented students and give them intellectually demanding and research-informed education that can prepare them for life-long learning attitude and to contribute as global citizens without prejudices.

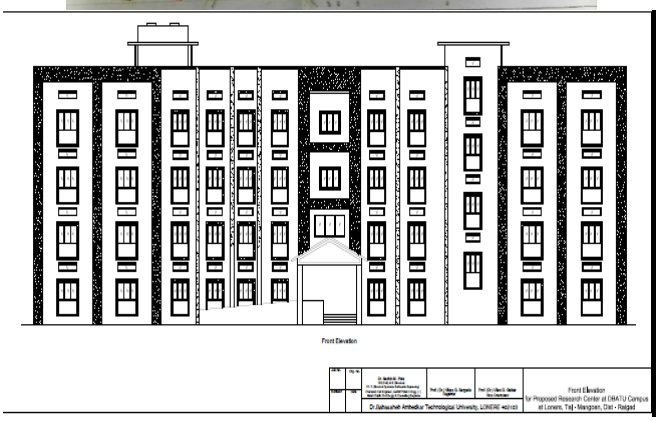
Currently, the University has no PG Centres and no faculty for teaching PG courses, although the faculty is qualified for the same. As a University, the DBATU should be at the forefront of the generation of new knowledge and its dissemination to interested stake holders. To augment the research activities, the University is planning to build at least three PG Centres to house all the research activities at its main campus. Two more PG centres should be added over the next five years to initiate research and development in areas related to Pharmacy, Biotechnology, Marine Science and Food engineering. It is envisaged that these centres should function in interdisciplinary manner and the faculty members shall be entrusted with the responsibility of building research capability of the Centres.

Provided below are the landscape and architectural plans for the new buildings

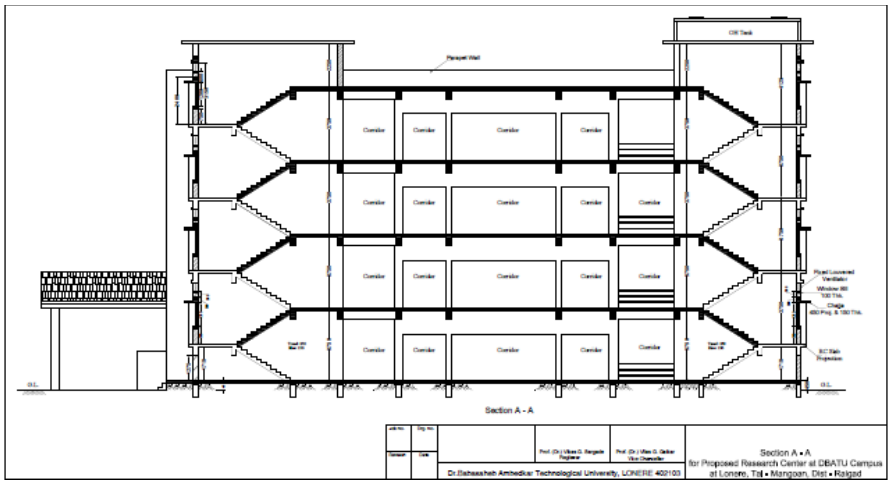
Academic & PG Centers



New Hostels



Regional Centers



14.7 Infrastructure & Facilities needed at Main Campus

Sr. No	Facility(No)	Details
01	Offices	
02	Vice-Chancellor (1) + VC's Secretariat	• 30x30 ft+ 20x20 Equipped with office furniture,, i7 processor Laptop/Desktop, printer-FAX, network connectivity, Working table, meeting table, Chairs, Kitchen table
	Pro Vice-Chancellor(1) + Pro-VC's Secretariat	• 30x30 ft+ 20x20 Equipped with office furniture, i7 processor Laptop/Desktop, printer-FAX, network connectivity, Working table, meeting table, Chairs, Kitchen table
03	Director(4) + offices	• (20x20 +20x20)x4Each office Equipped with office furniture, i7 processor Laptop/Desktop, printer-FAX, network connectivity, Working table, meeting table, Chairs,
04	Jt. Director(3)	• (20x20 + 15x15)x3Each office Equipped with office furniture, i7 processor Laptop/Desktop, printer-FAX, network connectivity, Working table, meeting table, Chairs
05	Deans(5)	• (20x20 + 15x15)x5Each office Equipped with office furniture, i7 processor Laptop/Desktop, printer-FAX, network connectivity, Working table, meeting table, Chairs
06	Chief Accounts &Finance Officer(1)	• (20x20+15x15)Equipped with office furniture, i7 processor Laptop/Desktop, printer-FAX, network connectivity, Working table, meeting table, Chairs
07	PG Centres / Research Schools (Nos. 08)	• G+3 structures, at least 10000sqft area of each building, Research Lab facility, Computer servers, Maker's Lab, Internet Connectivity
	Computer Network	• 1 GBPS fiber optics cabling
08	Curriculum Development & Teachers' Training Centre	• G+3 structure, having offices of Jt. Director, Secretariat & Offices of Centre, • Reception lounge, • Computer room with 30 desktops, • Seminar Room (No.2) with multimedia projection facility, • Library with e-resources, Simulation software, • Discussion rooms, Cubicles for visitors • Laboratory facility, • Offices for faculty/resource persons, • Stationary store, • Kitchenette, Self serving Kiosks for serving meetings • Tea/Coffee/ cold drinks vending machines,
09	Hostels	• Girls(05); Boys(07)
10	Residential Quarters	• G+3 (No. 5) Structures
11	UG Heavy Laboratories / Workshops	• G+2(No.3) structures
12	Convocation Hall cum Open Auditorium	• 1 for 1000 students
13	Solar Power Plant	• To cater to the needs of the Campus
14	Sports Complex	• Indoor games (Table tennis, Badminton, Squash)/ • Outdoor games facilities (Lawn Tennis, Cricket ground, Football

Sr. No	Facility(No)	Details
		Ground, Futsal ground) • Swimming Pool (?)
14	Security office	• Near main gate, with CCTV security cameras all across the campus
15	Shopping complex for residents	• For Routine shopping/ Recreational facility
16	School Facility for residents	• CBSE/ Kendriya Vidyalaya
17	Medical facility	• G+1 structure/ 5 bed hospital/ OPD
18	HMCT Building	• G+3 structure with 45 rooms for training, supported by students of the HMCT
19	Water management system	• Rain water harvesting, Water purification Plant(15000 lit/day)
20	ICT Infrastructure	• Servers, Net Connectivity
21	Centre for Product Design and Innovation	• Building, Maker's lab,

14.8 Infrastructure & Facilities at Regional Centre/ Sub-Regional Centre

Sr. No	Facility( )	Details
Offices In a G+3 structure		
	3rd Floor	
1	VC/Registrar and other Directors from main Centre	• Office room for University officers on visit, with adjacent furnished Studio apartments (2 Nos.)
2	Director	• (20x20 +20x20) on Ground floor • Each office Equipped with office furniture, • i7 processor Laptop/Desktop, printer-FAX, network connectivity, Working table, meeting table, Chairs
3	Examination Paper Cubicle	• 20x20 On top floor, access through biometric system. • The entire floor to be under 24x7 CCTV surveillance • Equipped with one Desktop without USB connectivity • With only internet Connectivity, Printer • Access through Double Biometric security for two people together.
4	Examination Office	• Examination section of 30x30; • equipped with 5 Desktops for office staff
5	Strong Room	• 30x30 for Storing answer-books with storage racks on wall • Equipped with high speed coding system, scanner and Computers
6	Server Room	• Equipped with Servers (2 Nos.)(Mirroring for Data of Cloud)
7	Control Room	• Equipped with 10 Computers with high speed connectivity • ICT Infrastructure
2nd Floor		
8	Affiliation Section	• Office with 5 desktops • Data entry Section • Visitors' Lounge

Sr. No	Facility( )	Details
9	Teacher's Training Centre	• Jt. Director-Industry Relations (20x20) • Director's Secretariat(20x20) • Office of Centre, Reception lounge, • Seminar Room (No.2; 30x30) with multimedia projection facility, Discussion rooms, Offices for faculty/resource persons Cubicles for visitors, Kitchenette for guests • Tea/Coffee/ cold drinks vending machines
10	E-Learning Resources	• Computer room with 30 desktops (40x30) • e-Resources, Simulation software
11	Industry Relations Cell	• Reception lounge,(10x10) • Meetings Rooms(5 No's)(15x15) • Self-serving Kiosks for serving meetings • Interview rooms(10x10) • Technology displays • Seminar Room for Pre-Placement Talks with Audio-Visual facilities(20x30)
1st Floor		
12	Network Cell	• Maker's lab(50x50) • Technology Incubation Cell(20x20) • IPR Cell (15x15) • High end Laboratory facilities(5 Nos.)(30x20) • Placement/ Internship Registration Cell(20x20) • Skill Development Cell(30x30)
Ground Floor		
13	Jt. Director(4) + Office Staff	• (20x20 +15x15) x 4 • Each office Equipped with office furniture, • i5/7 processor Laptop/Desktop, printer-FAX, network connectivity • Working table, meeting table, Chairs
14	Other Offices	• Security office with security officer(15x15) • Reception(20x20) • Students' Grievances Cell/ Counseling Cell(20x20) • Examination Registration of students • Revaluation Section(20x30) • Remedial Examination section(30x30) • Stationary store • Accounts and Stores • Canteen area(?) • Driver's area
15	Vehicles, Secure Van	• (3 Nos.) for Answer-books to ferry to Centre
16	Power	• Roof Top Solar Power with batteries
17	Water management	• Water purification plant using RO, Rain Water Harvesting system
18	Waste management	• Segregated Dry/Wet waste bins, Dry waste to recycle, wet waste to go in biogas system
19	Reprographic Facility	• Printers, scanners

Skill Development Centers

15 Skills Building Programmes to Improve Employability in Industry

The government has launched a massive programme for developing skills and needs institutions to undertake this work under PMKVK of the Central Government. Skills Development Centre can be established in each regional and sub-regional Centres of the University to support skills formation to fulfill the national needs. Curriculum for skills development has to be re-oriented on a continuing basis to meet the demand of the employers/industries and align it with the available employment opportunities

15.7 Skills Development Centres

The University is already conducting skills building programmes to cater to the employment needs of the industry. The government has launched a massive programme for developing skills and needs institutions to undertake this work under PMKVK of the Central Government. The University has been selected under this theme.

Skills Development Centre can be established in each regional and sub-regional Centres of the University to support skills formation to fulfill the national needs. Curriculum for skills development has to be re-oriented on a continuing basis to meet the demand of the employers/industries and align it with the available employment opportunities. The University may take sector-wise approach with special emphasis on those sectors that have high employment potential. The quality of training modules will have to be in conformity with the industrial sector. The University need to capitalize by launching large scale Skills development programme and become an important part of vocational education and training

15.7.1 Seminars, Workshops and other Interactive Activities

Seminars and workshops should be developed considering the central/state government programmes as well as the needs of the industry and social sectors so that the professional competence of faculty of the University and at affiliated colleges could be put to productive use.

The workshops should focus on training requirements of industry and government agencies through short term, mainly 2-3 day courses on different aspects. This can include safety, disaster management, project management, etc. The seminars and conferences should focus on wider national and state level policies and implementation issues

15.7.2 Distance Learning Programme

It is necessary to improve functioning of the distance system. The University has planned to create infrastructure for developing courses in specific areas of management like, project management, personal management, financial management, etc. These packages may be of shorter duration and job-oriented. These management courses will fulfill the need for expanding manpower in the service sector and in the industrial sector.

Data Centre of the University needs to be strengthened and upgraded to the international standard by establishing linkages with leading technical libraries in the world. Industries should be encouraged to use this facility at a nominal cost.

Networking and Collaboration

16 Networking with alumni and national and international collaborators

DBATU will continue to build mutually beneficial relations with its alumni during 2016–2021 so that a range of modes of engagement can be explored. BATU's efforts shall be recognized as a Centre of Excellence in Technical education and research resulting in increased international interest in the University. The University seeks to initiate exchange of research scholars with National and International Organizations. The emphasis will be on joint innovative student projects, and collaborative research for the latter.

16.7 ALUMNI RELATIONS

DBATU will continue to build mutually beneficial relations with its alumni during 2016–2021 so that a range of modes of engagement can be explored.

Steps that will be taken to achieve this objective include the following:

- Increasing the presence of the Institute in social media to promote engagement between alumni, students and faculty members
- Tele-calling and other personalized efforts to actively engage with alumni
- Increasing the number of face-to-face meetings
- Creating more opportunities for alumni to spend time on campus and engage with students and faculty.
- Alumni will be encouraged to support activities of the University in multiple dimensions: nurturing University–industry relations,
- facilitating interactions between aspiring students, faculty entrepreneurs and alumni entrepreneurs, transforming fund-raising to a professionally managed development effort and, in the case of alumni faculty members of foreign universities, catalyzing collaborations.
- Fund-raising will have multiple strands, foci and strategies for India and other countries. Professional management is to be brought in to increase endowments and donations.
- Regional and Sub regional Centre offices are being opened throughout the State, with appropriate staffing and incentive structures. The entire approach to fund-raising will be highly systematic:
- A 'Development Plan' will be linked to the Strategic Plan, and well-delineated projects will be defined for funding.
- A single consolidated database will be compiled.
- Industry linkages will be cultivated to attract corporate social responsibility (CSR) funding.
- Foundations will be profiled to match their giving interests and the Institute's aspirations

16.8 National and International Collaborations

BATU's efforts shall be recognized as a Centre of Excellence in Technical education and research resulting in increased international interest in the University. The University seeks to initiate exchange of research scholars with National and International Organizations. The emphasis will be on joint innovative student projects, and collaborative research for the latter. Through Research & Development efforts and Technology Transfer, the University aims to develop its brand value at the State Technical University.

Every individual in the organization shall be brand ambassador of the University and can take up steps to enhance the image of the University.

The University also has the goal of increasing the level of faculty exchange. Faculty members with proven record of research and Innovation and participating in international collaborations will be involved in exchange programmes. The Dean -National and International networking shall provide sharper focus and greater visibility to the University's programmes in these verticals. The Dean's Office will take a series of well planned steps to meet these objectives:

16.8.1 Research interest mapping.

Faculty across leading academic institutions will be paired with University faculty based on overlapping research interests in order to collaborate and co-supervise the research work of exchange scholars. Joint Ph.D. programmes will be set up with other universities that have an exchange programme with financial support. Such programmes will serve as magnets for research scholars.

16.8.2 Engagement with industry.

This will be in the form of three-way interactions (DBATU, academic partner and industry) and joint projects.

16.8.3 Formation of 'Account teams'.

The teams will comprise the faculty members involved with specific universities and Dean's staff members. These teams will manage relations with strategic partner institutions.

16.8.4 Facilitation of faculty and research scholar mobility.

Funding mechanisms to facilitate exchanges of scholars and faculty will be identified. Support will be enlisted from industry and alumni sources. Improvements will be made continuously on campus to make DBATU more welcoming to long-term foreign visitors

Regional Centres and Sub-Centres

17 Regional Centres and Sub-Centres

As per Sections 3(5) to 3(7) of Chapter II of the Dr. Babasaheb Ambedkar Technological University Act, 2014, the principal seat of the University shall be at Lonere in Raigad district in Konkan region, or at such other places as the State Government may, by notification in the Official Gazette, specify in this behalf.

The University shall establish Regional centres at Mumbai, Pune, Nagpur, and Aurangabad and at such other places as may be determined by the University, from time to time.

The University shall have five Sub-regional Centers at Kolhapur, Solapur, Amravati, Nanded and Jalgaon or at any other places decided by the Government of Maharashtra.

17.7 Human Resources at Regional Centres

1. The Regional center shall establish the following divisions or cells :
   a) Examination cell;
   b) Research and Development and Industry Co-ordination cell;
   c) Administration and Finance cell;
   d) Information and Communications Technology cell;
   e) Students Grievances Center.
2. Each of the divisions or cells shall be headed by a Joint Director,
3. The Sub-centers shall be operated and maintained as University's constituent unit, having University's complements of facilities, faculty and staff.

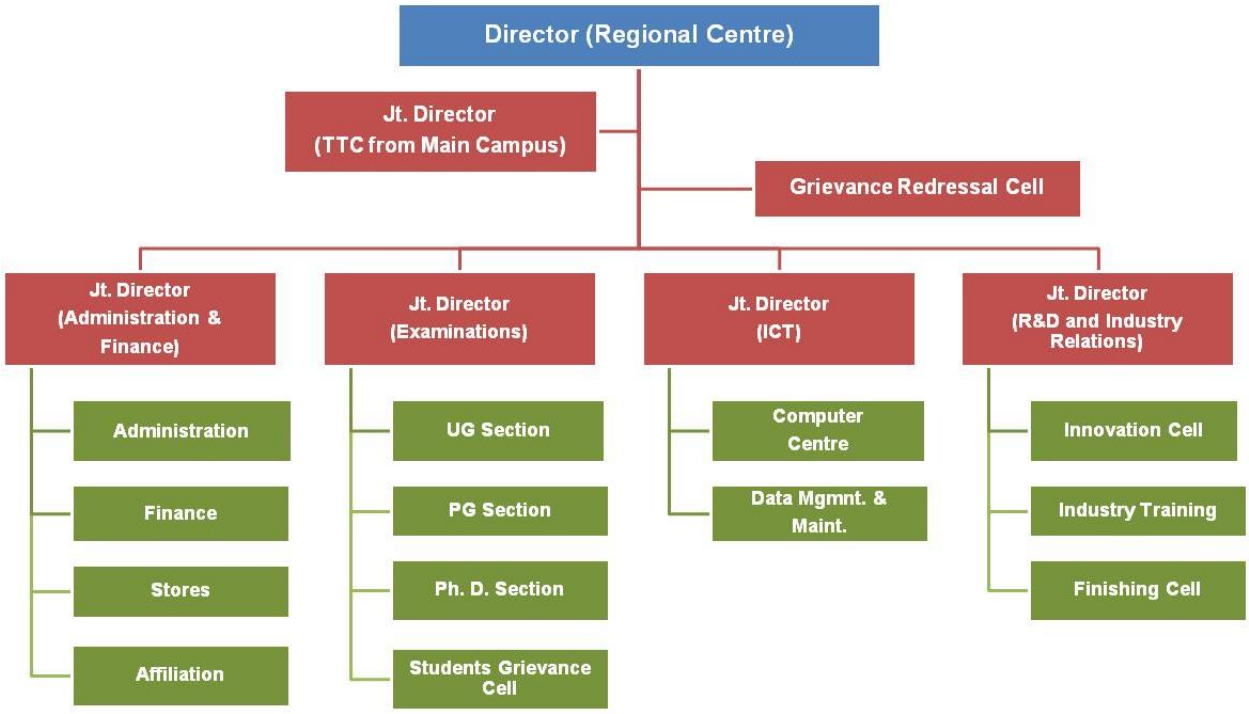


Figure 17.1 – Human Resources at Regional Centres

17.8 Sub-Regional Centres

There shall be five sub-regional Centres, one each at Amravati, Jalgaon, Nanded, Solapur and Kolhapur

1. Each Sub-Regional Centre shall have the following Administrative Directors

   a) Jt. Director- Head of the Centre
   b) Dy. Director -Examination
   c) Dy. Director- ICT
   d) Jt. Director-Administration and Finance

2. The Sub-center shall establish, within its campus, all or any of the following divisions or cells and such other facilities as it may deem fit:

   a) Examination cell;
   b) Administration and Finance cell;
   c) Information and Communications Technology cell;
   d) Students Grievances Center.

Each of the divisions or cells shall headed by Deputy Director,

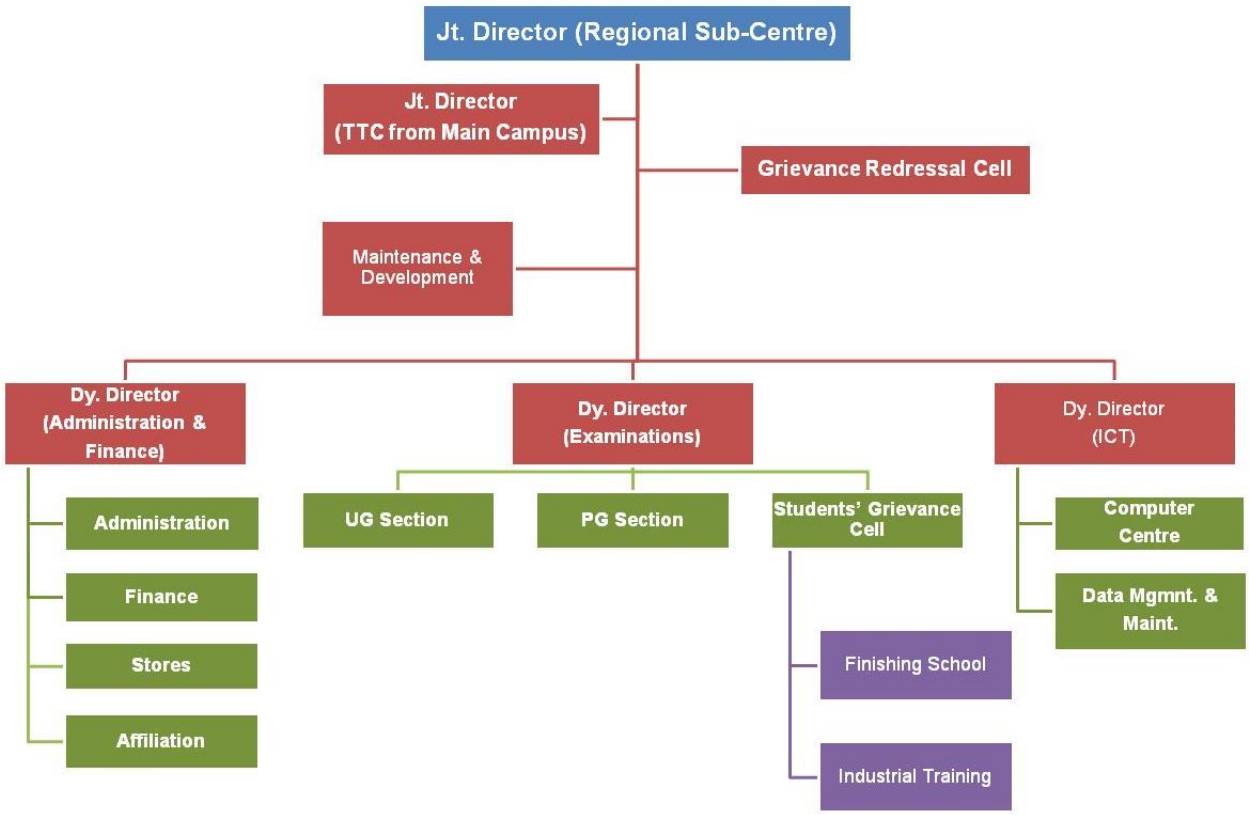


Figure 17.2 – Human Resources at Sub-regional Centre

17.9 Role and Responsibilities of Centres

The Regional Centre is the direct connectivity between the affiliated colleges and the University. Its primary role is to ensure timely and orderly conduct of the examination at designated examination Centres in the region. But it shall address many more functions of the University.

Since the academic activity, such as regular attendance of students, is important part of the education, Content delivery at the colleges shall be monitored by e-Attendance system. The system shall track the attendance in lectures and practicals by the students on regular basis and corrective steps shall be taken to address insufficient attendance. The University shall adhere strictly to 75% attendance in the classes to allow the candidate to register for the examination. The content delivery as per syllabus will be followed through the website of the college where all academic activities have to be put up by the concerned college. A significant Choice shall be offered by the academic system to students at college level as electives based on expertise of the faculty members. The College management should try to get faculty with necessary expertise in relevant areas.

17.10 Advisory Boards of Centres

The Departments of the University, already have Advisory Committees for guidance, evaluation and monitoring of all activities. The Advisory Committee also conducts audit of academic activities of the concerned Department.

In order to bring in good governance practices, it is proposed to have an advisory board for each Regional Centre and Sub-regional Centre. The Board shall be chaired by either a

prominent industry person who should be known for his progressive views and philanthropic activities or an academician of repute who has contributed significantly to science and technology at National as well as International levels. The members shall be invited or nominated on the advisory boards by Vice-Chancellor on recommendation from the Nomination Committee of the University. The Chairman shall have no direct stake in any of the colleges affiliated with the University.

The Advisory Board shall meet at least twice in a year to review the activities of the Centre and provide guidance for framing policies within the University rules and regulations to develop the regional technology landscape. It is hoped the members of the Board take active interest in the activities of the Universities by regular formal and informal visits to the Centre to have discussion with the teachers, students and industries in the local region to give guidance, help as and when required and constant encouragement. The members shall have no formal relation with any of the affiliated colleges. The membership of the Board shall be entirely honorary and no remuneration shall be payable to the members except the reimbursement of the travel expenses.

17.11 Institute-Industry Relations

The another prominent role that the Regional Centres play is in industry relations. It has been observed that major reason behind the un-employability of graduating engineers is the lack of exposure to latest industry practices. Even a majority of faculty in the colleges is without industrial experience or corporate exposure. To address this shortcomings, the Director-R&D and Industry relations shall be a bridge between academia and industry. He in coordination with Dean (R&D) shall survey the local industries for their needs. Meetings with local industry chambers and other captains of industry will be held regularly to seek cooperation from the industries to provide industrial training, not only to the students after the VIth Semester examination but also to the faculty desirous of getting industrial experience. The industry person will have to also market faculty expertise to help industry, especially as our industry is becoming more knowledge based. In general the faculty – industry relation require being more at a give and take level and not only a take-take level.

The Industries need to be convinced that the students at their door step today can be leading the industries tomorrow and could be their colleagues in near future. Apart from that, the students are lot more enthusiastic and could be having out of box ideas. They can take a fresh look at the problem faced by the industries where they cannot spare own manpower. The young students should be looked at as Human Resources without bias and given an opportunity they can work for extended hours without demanding pay rise. The young students also like to take challenges if those provide them opportunities to use their knowledge in more constructive manner.

The Jt. Director's responsibility shall include building relationship with industries, seeking problems to be solved by the Final Year students as real life projects. A continual dialogue with industry personnel will have to be maintained for synergistic collaboration. The Jt. Director shall also appraise the Industries the research and technology developments at the University and its affiliated colleges. The problems posed by the Industry shall be placed on the University's website for solutions in stipulated time and the solutions will be bid by the teams for acceptance by the same industry for implementation. This shall be very competitive and challenging exercise. The projects may be given in confidence too.

The Jt. Director shall promote and market the research done at the University in appropriate industrial forum. The technology developed at the University and affiliated colleges should be showcased in exhibitions on regular intervals and potential users can be tapped for commercialization. The inventors themselves can be encouraged to be entrepreneurs and start an enterprise rather than seek job. The University has developed a very good system for sharing the revenues earned from such endeavors.

17.12 Teacher's Training Cell

There shall be heavy emphasis on 'Train the Trainers' at the Teachers' Training Cell at each Centre. The Jt. Director at the main campus shall coordinate with all Centres for organizing the training program as per declared time-table. The Centre shall be equipped with Seminar rooms, audio-visual facilities, computer centres, Design tools, digital media room and high speed computer connectivity. In the initial phase the training shall be at the main campus but with establishment of the infrastructure at the Centres, training activities for teachers shall be conducted at regional levels.

The teachers shall be trained in Communication Skills, Pedagogy, interpersonal communication, financial management, IPRs, Research methodology, entrepreneurship, marketing, programming, e-content generation, video recording and management, web design, etc. The objective is to make a good leader from each teacher who can take responsibilities and be accountable to the students and for their growth.

Every new faculty must undergo pedagogy training for four-six weeks in a years' time of joining. The the candidates desirous to take academic jobs may undergo the training at a stretch while newly recruited teachers can undergo over a period. But initial training of one week at the main centre will have to be mandatory. With support from Jt. Director (Industry Relations), the cell shall facilitate training of teachers in industry during summer vacation preferably with some subsistence allowance. The cell also facilitate industry training of the faculty on competitive basis. The companies shall be called at the Centre to screen the candidates for internship either by written test or interview.

17.13 Grievance Redressal Cell

The Grievance cell shall address grievances of all stakeholders, students, staff and faculty alike. The Dean- Staff and Student Welfare shall be entrusted with the responsibility of addressing these issues. The Students' grievance Cell at the Centre shall address the academic issues of the students, including revaluation, registration, attendance deficiency, placement and college management. The online portal of the University will be available for registering the complaints but redressal will be done at the Regional Centre level. The Director at Regional Centres and Jt. Director at sub-regional Centres shall be responsible for it. A online grievance redressal system will be in place in two years time on establishment of the Centres.

Societal Relevance for the University and Affiliated Colleges

18 The University in the Society

The University shall be affiliating all the Engineering, Pharmacy, Architecture and Hotel Management and Catering Technology Colleges in the State of Maharashtra under one umbrella in the next five years and will take active part in promoting awareness about science and technology in masses, developing and propagating technological advances, conductive research and innovation activities at the university departments and in affiliating colleges for the benefit of society and industry, in particular in the state of Maharashtra, individually and in association of other scientific, technical, industrial and social organizations, and providing technological interventions for the benefit of the society.

The DBATU, as the State Technical University, shall invite collaboration for research, innovation, technical evaluation, scientific development and technology intervention for self-employment, skilled wage employment opportunities and improving standard of living of local communities through various policies and other aspects related to Tribal Development in the state of Maharashtra. The University has signed an agreement with the Tribal Department, GoM, for the same and has initiated activities at the Main campus.

The objective of the integrated approach is to develop relevant and user-friendly technologies which are relevant and useful for improving rural livelihoods. Training can be also imparted to interested budding entrepreneurs for their skill up-gradation so that they can start their enterprises. We can focus on "Make in India". The idea is to identify critical gaps and address them by enhancing the quality and marketability of the products having an eye on market demand.

Many NGOs who work with rural areas and for the development of rural populations, know the needs of the people but may not have technological resources solve the problems. The intervention of the University shall be in providing technological solutions at affordable means. The aspirations of the people whether in rural or urban are always the same and access to proper education is a major milestone for lifting their standard of living. It may be necessary to involve the community itself in formulating their problem and NGOs can work out a modus operandi for integrating the technological developments from the University to provide relevant solutions.

Similarly, any technology interventions should lead to employment generation in order to sustain it for longer period and widespread acceptance. It should be also affordable by every one in the area and its impact must be visible.

The University shall initiate several activities in collaboration with the Industrial Organizations under their Social Corporate Responsibility, as technical partner in education and social upliftment through technological interventions.

- **Spreading Science and Mathematics Education in Schools in Rural/Tribal Areas** using the National Service Scheme volunteers of the University Departments and Affiliated colleges which may include building laboratory experiments useful in remote areas, affordable but rich learning experience for students through Mobile Science Laboratory(ies), bringing different learning experiences among the students in rural settings, aptitude tests and coaching in Science and Mathematics, developing learning tools. A pilot project is under proposal stage for funding from an industry.

- **Community Services** for by providing affordable technologies or services, including potable water and affordable health care using traditional knowledge of medicinal plants.
- **Technological interventions in Rural Economy** by identifying the local resources and identifying their potential value(s) in market
- **Information dissemination in Rural areas** using Community Radio Service and digital literacy programs. The University is in the process of establishing a Community Radio Service.
- **Skill Development in association with National Skill Development programs** and in collaboration with Sector Specific Skill Development Councils and their partners
- **Providing manpower support** including student interns for various field projects, data collection, compilation and analytics to Departments of GoM, i.e., Tribal development department , Women & Children Welfare Department.
- **Any Activity which involves Science and Technology interventions** for the development of Tribal populations, such as service provisions for solar dryer for forest produce, medicinal plants.

The work area of the University is whole State of Maharashtra. The University through all affiliating Engineering, Pharmacy, Architecture, Hotel Management and Catering Technology colleges will work to carry out Scientific and Technical Projects/ training programmes/ other related work for developing Tribal population of the State of Maharashtra with specific objectives, terms and conditions. The Industry shall provide necessary financial support to organize and run the need based training programmes for tribal population and to develop products/ prototypes for societal applications. The industry will endeavor, to provide paid/unpaid internship opportunities to students of DBATU and of affiliated colleges in different regions of the State of Maharashtra under the scheme.

18.7 Spreading Science and Mathematics Education in Schools in Rural/Tribal Areas

There is shortage of trained manpower in the schools in rural areas. Most of the times, the teacher may not have science and mathematics background. It leads to un-inspirational teaching. This gap can be filled by a program along the lines as that of 'Teach India'. The engineering students are expected to have good science and mathematics background. If these students volunteer for teaching Science and Mathematics in the rural schools we will be able to develop appropriate scientific temperament amongst the school students at first and then in the local community. Each college under the University can adopt a village or tribal hamlet for such activity. The NSS volunteers of engineering colleges can be trained to teach mathematics and science subjects, making those more interesting to understand. The students will be supported through internship, and incidental expenses. The outcome shall be increased awareness of science and technology, cleanliness, hygiene and better career planning by the youth.

18.8 Design and developing Science Labs (Mobile labs)

The engineering students can also develop tools for better understanding of scientific principles for the schools and colleges. It is possible to build simple laboratory units at a fraction of imported cost using local resources and local talents. Also science laboratories in these schools can be developed with help from enthusiastic young and creative students in engineering disciplines. Out-of-box ideas can be developed as scientific tools for inspiring the school students. These labs should be treated as exploration space with free hand given to the students for handling the equipments.

If it is not possible to develop a lab in each school for the want of adequate space and other infrastructure, a mobile Science bus can be developed that can be taken to villages where the schools are situated. A group of volunteers from engineering colleges may drive the project. The efforts of the students can be appreciated by giving credits in their project.

The University's Science Express can be designed and custom built with support from Industries and equipped with LCD panels, miniaturized experimental setups, innovative experiments, as a self sufficient laboratory space. The bus will fitted with Solar panels on its roof to generate its own electricity for LCD panels and air-conditioning. The Bus and its operation and recurring cost can be supported by Industry while University graduates will be volunteering for spread of the scientific knowledge. It should not be a collection of run of the mill demonstration experiments but the tools should be handed over to the school students to play around and figure out their applications and underlying principles.

18.9 Community Services for betterment of Economic Conditions- Agricultural practices and traditional medicines, forest products

Most of the population in rural areas, is not well educated. There are hardly any technological skills although traditional skills may exist. There is also migration issue associated with the population as regular income generating activities do not exist. Many of the tribals have no access to education, healthcare and pure drinking water or even access to many Government schemes of use to them. But some of them may have a good knowledge of local terrains and medicinal plants. Many of them migrate for most of the part of year elsewhere for search of jobs. There is need to develop systems around their local resources. The areas may need to develop new agricultural practices, including vertical farming for making effective use of rocky terrain of Konkan Region. The cultivation of medicinal plants or other crops where conducive natural environment is available may also be provided. An excellent example of such an activity is cultivation of coffee beans by Mahindra under CSR activity in Andhra Pradesh with tribals with appropriate training. The tribals may also be encouraged conduct vertical farming when terrain is rocky for cash crops including vegetables. The identification of plants with medicinal properties may be possible with traditional knowledge of medicines. An organized cultivation of such products may allow the tribals to earn sustained earning and support themselves.

The forest produce such as cashew nuts and mushrooms are seasonal and perishable. Most tribal women are seen selling these along roadsides throughout the day. However, services such as solar drying if provided at a nominal cost the produce can be stored for longer time. There is hardly any food preservation facility in the region. If the local community is provided training in food processing, the product can be stored for loner time. For example, mango pulp or berry juice can be stored in tinned cans for longer times and marketed to tourists in off-season periods too.

The Hospitality service can be taught to local youth who can be trained as guides for local history, maintaining cleanliness of the region to attract tourists, and with multilingual training. The digital space can be also utilized to market the history of the place. Having guided treks in the hills of Sahyadri can be another option for economical activities.

18.10 Technological interventions for rural economy

The benefits of technology in the rural areas are limited to mobile phones and TVs. We might need applications of known technological advances in the farming and ancillary units. It may be linked to agricultural practices, preservation of the farm produce by drying or cold storage of perishable items, monitoring the growth of plants and crops, early detection of diseases, controlled dosages of fertilizers and of other chemicals, drip irrigation, sensing moisture content of soil and of micronutrients. It may be connected with marketing, online purchases and bidding, inventory managements, and supply chain management. Many of these needs can be linked with local colleges where real life projects can be taken up after discussion among the stake holders. Some of the other projects that can be taken up for benefit of the Tribal society would be Low cost Solar Lights, Low cost solar chargers, Community Solar Chargers, Preservation of food, vegetables fruits, and fish by solar dryers, canning/drying of food products with long storage periods, raring honey bees, plantations of cash crops, including spices and medicinal plants, organic farming, vermi composting, energy efficient stove, solar cookers, etc.

18.11 Information dissemination in rural setting by easily accessible means

Digital economy is still yet to take roots in the rural economy and there is need to educate a large section of society for digital transactions. There is some degree of mistrust also about the digital economy because of recent demonetization drive. Most rural and tribal population is not aware of many welfare schemes or they have no means of knowing it. We need to build a visual system, for making them aware of these government schemes. We would like to build a Community Radio service, which will keep the community aware of developments in the University and surrounding areas.

18.12 Skill Development program

If the population is educated at least to 10th Std, the skill development program can be implemented for unemployed youth. Even for graduates from such belt, additional skills are required to be remain competitive. The University would like to conduct the skill development program for unemployed youth with support from Government or industry. The program can be conducted with help of the Sector-specific Skill Development Councils under National Skill Development program. This program has potential of extension to graduates, particularly fresh engineering and diploma holders. The Skill Development programs can be initiated at the University Campus in active collaboration with the Skill Development Councils. At present, each sector specific skill development program is planned over three semesters with an approximate cost of Rs. 2500 per student per semester, the cost of a faculty member is Rs. 10000/- per person per semester.

18.13 Water Shed Management in the University Campus and Adjoining Areas

The Konkan region probably sees one of the highest rainfalls of the country in every monsoon. The agricultural activity is limited in the four months of the monsoon in most part of the region. The main campus of the University gets even flooded at least once in every year. However, as soon as monsoon is over, the area becomes dry as all the water flows to nearby sea. Heavy precipitate also washes out the fertility of soil leaving behind dry sand which cannot support vegetation. Although a canal system flows around the campus, no water is available in summer months, creating water shortage for residents of the campus and also in nearby villages.

It is proposed to have water bodies as interconnected ponds to store rain water on the University campus. The topology of the campus has been studied and potential of storing water has been identified. However, a detail and professional study is needed in the first attempt. It could be followed by deepening at least 10 acres of the campus area as interconnected ponds, where significant water can be stored. The water can be used for the residential purposes. Today all water requirements are met by pumping water from a dam located about 25km away from the campus. The proposal is to seek financial support to conduct the detail survey by professionals who are experts in the field to arrive an appropriate solution for water shortage on the campus during summer. The project will be supported by the University using its manpower of students who can take active part in the project.

The campus is spread over 468 acre and enough land is available for creating water reservoirs. This water can also be made available to tribal population staying around the campus for agriculture. It will add significant value to the economy if the natural resources are used effectively. The University has signed an agreement with Rotary Club for Water management project. The Project has received funding from the Rotary club at different levels and two streams around the campus shall be used to store water by check-dams at different lengths. The local rural population will get immense benefit from this project, particularly to take second crop.

PEM for University Departments & Colleges

19 Planning, Evaluation and Monitoring of the University and colleges

Along with the academic audit the departments and affiliated colleges shall be evaluated by the PMEB of the University.

19.7 Planning, Evaluation and Monitoring of the University and Affiliated Colleges

The following parameters shall be used to monitor and evaluate the progress of the University and that of affiliated colleges using the status of 2015-16 as the base case.

Key Performance Parameters for Monitoring and Evaluation Framework	Percentage
1. Curriculum	**20%**
Quality of the curriculum	
Regular curriculum revision in line to technological developments	
Focus on mix of theory, lab. work, case study	
Industry participation in curriculum design	
2 Teaching and Pedagogy	**20%**
Qualification and Competence of the Teaching Staff	
% of permanent teaching staff on roll	
Healthy teacher/student ratio	
Teaching methodology	
Use of modern learning aids and methodology	
Utilization of Feedback on teaching and pedagogy	
Attendance and Timely evaluation Processes	
3. Physical Infrastructure	**10%**
Adequacy of classrooms, laboratories and other facilities	
Adequacy of libraries and availability of digital content	
Hostels and residential facilities for faculty and staff	
ICT Infrastructure and E-learning resources	
Recreational facilities	
4. **Learning Resources**	**10%**
Library and Modern Learning resources	
Institute Publications and Case Studies	
E-Learning Modules developed	
Availability of e-courses and % therereof	
5. Organization, Governance and Management	**10%**
Quality of Governing body and leadership	
Appointment of faculty and staff as per AICTE and State Government norms	

Key Performance Parameters for Monitoring and Evaluation Framework	Percentage
Transparency and efficiency in functioning of the institute	
Regular Audit of Process, System and Finance	
Internal Revenue Generation and development expenditure	
Sustainability of operations and Financial Position	
Long term Vision and Mission	
Grievance Redressal System	
Students' Involvement	
6. Industry Linkages	**10%**
Industry sponsored projects for faculty	
Visiting/Adjunct faculty from Industry	
Placement of students in industry	
Number of Scholarship from Industry	
Number of Joint projects with industry	
Number of Industry Chairs in University	
Industry Participation in Governance	
Training of Industry personnel	
7. National & International Linkages	**5**
Faculty exchange program, if any	
Student exchange program, if any	
MoUs with reputed international institutions	
Joint Research projects	
Joint educational programs	
Joint publications and patents	
Joint development programs	
8. Research and Innovation	**10**
Research facilities and promotion of research culture	
Number of publications in SCI indexed journals by faculty	
Number of patents filed, granted and commercialized	
Number of Research Projects	
Amount of Research funding and % utilization	
Number of Innovation products, Patents and value addition	
Number of Entrepreneurs and Start ups from University	
Joint projects with industry and value of revenue	
9. Satisfaction Index (from Surveys)	**5**
Students	
Staff	
Faculty	
Industry	
Society	

Perspective Plan In a Nut Shell…

What the University is aiming for…

Academics:

Curriculum Development	Academic Resources
• Orientation programs for Teachers • Development of dynamic curriculum with industry input • Professional skills development in students, staff, and Faculty • Choice and flexibility through elective subjects • Participation of industry professionals in teaching and advisory boards • Student-centered learning strategies • Project and research based teaching-learning processes • New pedagogy methodology • Motivating teachers for research	• Standardize lab practices in the institutes across the state • Well arranged lab manuals • Creating learning space in each Institute • Scientifically customized learning resources in each discipline • Transparent documents between the teachers and students • Continuous updates of the manuals and lecture notes • Compulsory industrial visits/training • Software's for subject domain learning • Mini projects for integrating skills • Interactive expert lectures • Free educational resources
Academic Monitoring	**E-Learning**
• Faculty development • Curriculum Implementation and Assessment Norms • Continuous assessment • Result Analysis • Development and Use of new learning resources • Students attendance • Library facilities and e-Resources • Laboratory standards and Manuals • Closed Loop system i.e. corrective measures through feedback mechanism. • Well trained engineering Teachers • Mandatory NBA accreditation for Institutes after five years of establishment of courses. • NAAC accreditation of colleges & Academic audits	• Establishing virtual learning centers at regional and sub-regional centres. • Relay/Video streaming of lectures from digital media studios at regional centres • Students and teachers of remote colleges to benefit. • Involvement of other universities in the network for digital learning's. • Online certificate courses and remedial exams • Career counseling sessions. • MoUs with IIT Bombay/ Madras and other institutes for training in software • Spoken Tutorials and Online freeware • e-Depository of lectures, presentation, educational videos • On-line e-courses for learning & audit courses.
Language Laboratory	**Online Remedial Examination**
• Communication skills development • Technical & business writing skills development • Foreign language skills (students and faculty) • Establishment of remote colleges on priority basis • Training for teachers for communication with students	• Online examination centers • Instant result declaration. • Examination centers for physically challenged. • Open office choice available. • Practical questions.
Other Projects	**Question Banks**
• Conduct of Online Digital Evaluation across the state • Conducting Result Processing • Common Examination and Tests. • Search Conferences, Job Analysis, Market Survey • Key performance indicators of colleges, normalized over district level and of University	• Question Banks for important subjects • Balanced and errorless Question Papers. • Audit of question papers • Numerical solutions and answer keys for question paper on completion of examination • Question Paper profiling

Human Resource Development:

Faculty Development	Industrial Training for Teachers
• Orientation trainings • Subject/Content updating training • Pedagogy -Teaching and Learning processes • Industrial Training • Management skills (Project & Time management) • Hands-on-skills trainings. • Financial management training, • Intellectual Property Management • HR and Interpersonal Communications training • Life Skills, communication skills & Professional Skills • Research Methodology	• Industry Education Partnership Cell • Collaboration with Industrial Organizations • Deputation for industrial training • Latest state-of-the art technology developments • Industrial/Corporate Practices exposure • Latest shop floor practices and Human Resource Management • Confidence and self-Esteem building • Innovation and Research skills
Build Academic Expertise	**Center of Excellence**
• Design and Development of Need based Curricula. • Design and Development of Lab Manuals and other virtual resources. • Academic Audit of Technical Institutions. • Faculty & Student development program. • Conduct of on-line Examinations • Result Processing and analysis • Joint Certification Programs with industry and other organizations. • Consultancy Services • Focus on development of skills and competencies for solving real life problems	• To meet the current needs of industry and Society • Industry-Institute Partnership in Innovation. • Bridging technology gaps between industry and academics. • Improve employability and entrepreneurship. • Hands on Practical Experience of recent technologies practiced in the industry. • Faculty development and enrichment. • Project and research programs. • Setting up CEP Programs. • Revenue generation. • Information Processing and Planning of research • Technology development and Transfer
Skill Development	**Non Teaching Staff Development**
• For skilling rural unemployed youth and providing employment. • To become entrepreneurs. • To promote science and technology development • To support 'Start up' for traditional knowledge	• Industrial/Corporate Practices exposure • Hands-on-skills trainings • Deputation for industrial training • Confidence and Self-esteem building • HR and Interpersonal Communications training • Qualification improvement

Administrative Reforms:

e-Governance	
• Cashless transactions • E-correspondence with affiliated institutes • Quick and confirmed communication. • Information dissemination (Circulars, Academic Calendar, Curricula, Exam Timetable, Exam Results, Office Orders, Hall tickets, etc. available on web site) • State-wide University Info. Management System • On line affiliation system	• Online submission of registration, marks-sheet, declaration of results • Online information dissemination • Online availability of faculty, staff and students data • On-line registration for courses • Online transcript application • Demat account of degrees and certificates • Online verification of information • Online feedback • Online attendance system and e-Notice board

Student Centric Activities

State/National Level Student Technical Quiz Competitions	State/ National Level Student Technical Paper Competitions
• Learning peripheral and interdisciplinary knowledge. • Development of broader vision for opportunities. • Knowledge sharing. • Development of confidence and self-esteem . • Grooming to Industry's expectations of professional competence. • Certification and Cash prizes for winning teams and Internships	• Self-study skills • Presentation skills • Information search skills • Research abilities • Knowledge sharing skills • Defense skills
Career Fair	**Talent Search**
• Technical & Vocational education reaching to the rural masses. • Dissemination of information to the students • Aptitude Testing • Student Counseling • Information on Industrial Training. • Motivating Lectures • Theme talks :	• Promoting innovation, talent and Creativity programs through project competition. • Encouraging with cash prize for winners • Finishing Schools-Life Skills, communication skills & Professional Skills
Scholarships	**Training and Placement**
• Scholarships to needy and meritorious students • Social responsibility of Scholars	• Create platform for placement through campus interview, Pool Campus. • Create equal opportunity for students and industries in urban as well as in rural areas. • Finishing Schools, Counseling and Remedial Training
Internship for Students	
• In-plant training /internship of one month each after 4th semester and 6th semester for all students of in Engineering • Six months Apprenticeships in industry after graduation	

Promotion of Innovation

Innovation	Networking Resource Centre
• Promote and boost the ability of faculty & students towards innovation • Innovation for product, process or system • IP management and processing fees for patent • Technology Transfer support • Incubation Centre	• Champion Industry & Patron Institute connected together & assists other institute(s) for industry interaction. • Promotion of industry meetings and participation in education and Incubation of ideas • Number of ideas incubated

Promotion of Excellence

Best Laboratory Award	Best Industry Institution Interaction Award
• To motivate institutes to develop full fledged laboratory in engineering discipline. • Requirement: ▪ All working laboratory equipments required based on curriculum ▪ Development of in-house new experiments ▪ Completion of 100% practical's as per curriculum ▪ Additional learning material developed etc.	• To encourage & acknowledge institutes to develop interaction with industry. • Requirements: ▪ Industry visits, Percentage students sent for training, ▪ Number of industry sponsored projects, Industry training attended by faculty ▪ Number of self organized trainings, Number of

<table>
<tr><td></td><td>industry lectures arranged
▪ Industry training workshops</td></tr>
<tr><td>Best Partner Institute Award</td><td>Best Research Award</td></tr>
<tr><td>• To Encourage institutes to participate in networking activities with the University & error free execution of examinations
• Requirements:
▪ Excellent academic performance,
▪ Conduct of examination,
▪ Assessment center, No lapses,
▪ Acceptance & execution of directives for training,
▪ Curriculum development,
▪ Laboratory Assessment, paper setting, assessment etc.</td><td>• To encourage colleges to pursue research in frontier areas of technology
• Requirement:
▪ Number of papers in high impact Indexed journals
▪ Maximum number of faculty involved in research
▪ Maximum amount generated as research funds</td></tr>
<tr><td>Best Innovation Award</td><td>Best Entrepreneurship Award</td></tr>
<tr><td>• To encourage innovation in all sectors of education fields
• Maximum innovative ideas
• Best Commercialized patents
• Maximum encouragement to students and faculty and staff to innovate</td><td>• To encourage entrepreneurship in graduates in all sectors
• Maximum entrepreneurs</td></tr>
<tr><td colspan="2">Best Teacher Award</td></tr>
<tr><td colspan="2">• To Motivate and appreciate teachers for teaching
• For outstanding teachers in University and affiliated colleges
• Criteria: Innovative teaching methodologies, concern for students, expertise in subject domain and popularization of science and technology</td></tr>
</table>

Annexures

Annexure A

Responsibilities of Directors and Deans

Registrar/ (or Director)- Administration

The Registrar/ Director- Administration shall be responsible, with support from Dy. Registrar, for

- Administration of the staff and faculty,
- General discipline in faculty, staff and students,
- Welfare of staff, faculty and students,
- Infrastructure development at the Main centre,
- Coordination with the Department of Higher and technical education of the Government of Maharashtra,
- Security and maintenance of facilities at the center,
- Coordination with regional and sub-regional centres,
- Affiliation of colleges,
- Appointments of staff,
- Contracts for outsourced services,
- Maintenance of administrative records and
- Any other administrative matter that the University might be dealing with.

Director of Academics (& Examination)

The Director- Academics & Examination shall be responsible for

- Planning of academic activities in the university departments and affiliated colleges, conducted Institutions
- Conduct of the examinations in the University and affiliated colleges in the Regional Centres and Sub-regional Centres
- Curriculum development with support from deans of faculties,
- Formulate the policies and development program of the faculty
- Training of teachers in University departments and affiliated colleges
- Coordination and conduct of examinations, declaration of results in time
- Maintenance of academic standards in the University
- Accreditation of courses in the University departments and in affiliated colleges
- Admissions of students in courses
- Appointments and approval of faculty in affiliated colleges and University departments and conducted Institutes
- Redress of student's academic grievances
- Convocation and all other matter related to academics

The Director of Academics shall convene meetings of the faculty, as and when required, in consultation with the Vice-Chancellor and shall preside over the same. He shall formulate the policies and development program of the faculty and present the same to the appropriate authorities for their consideration

The Director of Academics shall be responsible for the academic development of the faculty and shall ensure proper implementation of the decisions of the Executive Council, Academic Council, and the Board of Examinations in respect to his faculty and the decisions of the faculty and the Boards of Studies under his purview.

Subject to the superintendence, direction and control of the Vice-Chancellor, the Director of Academics shall, after taking such advice as he thinks necessary, decide upon the grievances of students regarding

the enrolment, eligibility, migration, scholarships, studentships or free-ships, grant of terms, admission to university examinations

Director of Academics shall enquire, on being directed by the Academic Council, in to malpractice related to any academic program in his faculty by a University department, affiliated or conducted college or recognized institution and report the findings to the Academic Council.

The Director of Academics shall monitor the quality of education by the way of accreditation of the programs by concerned authorities in the University, conducted colleges and Institutes, Centers, Schools and affiliated colleges.

The Director of Academics shall conduct the surveys in the University, conducted colleges and Institutes, Centers, Schools and affiliated colleges of the students and faculty for feedback on the quality of education and recommend necessary remedial measures for implementation in the University and affiliated colleges

The Director- Information & Communication Technology

The Director- ICT, shall be responsible for

- Establishment and maintenance of ICT infrastructure for smooth functioning of the University and regional centres and regional sub-centres,
- Development and maintenance of State wide MIS system for affiliated colleges, university departments, the existing students, their academic profiles, Faculty profiles, Teaching and learning processes,
- Conduct of online courses,
- Maintenance of website,
- Maintenance of web related services for faculty, staff, students, alumni and industry,
- Conduct of online examinations
- Scanning of the answer books
- Data management,
- Submission of data to regulatory bodies such AICTE, UGC, NIRF, MHRD etc.,
- Data analysis of examination results,
- Development and maintenance of network communication within University and between the Centres,
- Development of ICT systems for functioning of the University and
- Any other matter requiring ICT expertise

Director/Dean- Research and Development and Industry Relations

The Director/Dean- Research and Development and Industry Relations, shall be responsible, with support from Jt. Director-Industry coordination

- For promotion of research and technology development,
- Undergraduate and post-graduate research projects,
- Industry coordination and collaboration between the colleges under the University, and with other research and academic organizations,
- Transfer of technology,
- Maintenance of research quality in university departments and affiliated colleges,
- Coordination of resources for high quality research,
- Interaction with industry,
- Training of students/ Faculty in Industry
- Training of Industry personnel in University/ Centres
- Patents and other intellectual property matters,
- Extensional work and any other matter related to research and development in Technology and engineering.

Deans- Faculties (Engineering, Pharmacy, Architecture & HMCT)

- Planning of academic activities in the University departments and affiliated colleges, conducted Institutions,
- Curriculum development,
- Maintenance of academic standards in the University,
- Accreditation of courses in the University departments and in affiliated colleges,
- Admissions of students in courses,
- Student's academic grievances,
- Convocation and any other matter related to Academics

Dean- Staff and Student welfare and Alumni Relations

- Training Need analysis of Students ad Finishing school
- Counseling to students and communication with parents
- training of faculty staff in University departments and affiliated colleges,
- Coordination with Alumni,
- Alumni meetings,
- Data maintenance of alumni
- Students scholarships
- Fee waivers
- Transcripts, Mark-lists, Degrees
- Training and Placement
- Verifications

Dean- Innovation and Incubation Centre

- IPR Cell
- Innovation and Incubation Centre
- Start Up Boot camps
- Training in Finance, Business, marketing management
- Incubation and Competitions
- Communication with investors
- Training in entrepreneurship

Dean- National & International Collaboration

- Networking
- MoUs with other organizations
- Collaborative Projects
- Information Processing
- Communications with organizations outside University

Jt. Director-Examination

Each Jt. Director-Examination at Main Centre, Regional Centres and sub-Regional Centres shall be responsible for,

- Appointment of examiners for setting question papers and assessment of answer papers,
- Printing and distribution of the question papers,
- Conduct of the examinations in the University and affiliated colleges in the Regional Centres and Sub-regional Centres,
- Coding and scanning answer books,
- Online evaluation of the answer books through examiners, and timely declaration of results and results analysis
- Online examination for remedial measures
- Revaluation
- Student's grievances related to examinations and results
- Compilation and Analysis of examination results

Jt. Director- Industry Relations

- Industry coordination and collaboration between the colleges under the University, and with other research and academic organizations,
- Transfer of technology,
- Training of students/ Faculty in Industry
- Training of Industry personnel in University/ Centres

Jt. Director- ICT

- Maintenance of State wide MIS system for affiliated colleges, students, their academic profiles,
- Conduct of online courses,
- Maintenance of web related services for faculty, staff, students, alumni and industry,
- Conduct of online examinations
- Scanning of the answer books
- Data management,
- Development and maintenance of network communication within the Centres,
- Any other matter requiring ICT expertise

Jt. Director- Administration and Finance

- Administration of the staff and faculty,
- Infrastructure development at the regional centers and sub-centre,
- Security and maintenance of facilities at the center,
- Coordination with main center,
- Affiliation of colleges,
- Maintenance of administrative records and
- Any other administrative matter that the University Centre might be dealing with.

Jt. Director- Curriculum Development & Teachers' Training Centre

- Preparation of Modules for Teachers' training
- E-learning resources
- Time Table for Teachers' training program
- Communications with external resource persons
- Planning and execution of Training programs
- Training Need analysis of University teachers and teachers from affiliated colleges

Job Responsibilities of the ICT Section:

Wed Administrator – ICT at Main Campus

- Manage web environment design, deployment, development and maintenance activities.
- Collaborate with development teams to discuss, analyze, or resolve usability issues.
- Develop or implement procedures for ongoing web site revision.
- Perform testing and quality assurance of web sites and web applications.
- Check and analyze operating system or application log files regularly to verify proper system performance.
- Test backup or recovery plans regularly and resolve any problems.
- Ensure that the web servers, hardware and software are operating correctly. To monitor health of web servers and overall website environment.
- Recommend web site improvements
- Develop budgets to support recommendations.
- Implement updates, upgrades, and patches in a timely manner to limit loss of service.
- Identify, standardize, and communicate levels of access and security.
- Inform web site users of problems, problem resolutions or application changes and updates.
- Provide training or technical assistance in web site implementation or use.
- Correct testing-identified problems, or recommend actions for their resolution.
- Develop testing routines and procedures.
- Evaluate testing routines or procedures for adequacy, sufficiency, and effectiveness.
- Identify or document backup or recovery plans.
- Gather, analyze, or document user feedback to locate or resolve sources of problems.
- Develop web site performance metrics.
- Back up or modify applications and related data to provide for disaster recovery.
- Test issues such as system integration, performance, and system security on a regular schedule or after any major program modifications.

- Install or configure web server software or hardware to ensure that directory structure is well-defined, logical, secure, and that files are named properly.
- Collaborate with web developers to create and operate internal and external web sites, or to manage projects
- Administer internet/intranet infrastructure, including components such as web, file transfer protocol (FTP), news and mail servers.

Network Administrator – At Main Campus

- Design, organize, modify, install, and support organization's computer systems
- Design and install LANs, WANs, Internet and intranet systems, and network segments.
- Install and support LANs, WANs, network segments, Internet, and intranet systems.
- Install and maintain network server hardware and software.
- Analyze and isolate issues.
- Monitor networks to ensure security and availability to specific users.
- Evaluate and modify system's performance.
- Determine network and system requirements.
- Maintain integrity of the network, server deployment, and security.
- Ensure network connectivity throughout a University's LAN/WAN infrastructure is on par with technical considerations.
- Design and deploy networks.
- Perform network address assignment.
- Assign routing protocols and routing table configuration.
- Assign configuration of authentication and authorization of directory services.
- Maintain network facilities in individual machines, such as drivers and settings of personal computers as well as printers.
- Maintain network servers such as file servers, VPN gateways, and intrusion detection systems.
- Administer servers, desktop computers, printers, routers, switches, firewalls, phones, personal digital assistants, smart-phones, software deployment, security updates and patches.
- Identify, standardize, and communicate levels of access and security.
- Evaluate or recommend server hardware or software.

Database administrator At Main Campus:

- Perform the task of maintaining the database environment to ensure its availability and that it runs smoothly using database tools to monitor, fix and maintain the physics of the database software and the hardware on which it runs.
- Maintain and monitors database systems using replication, log-shipping, backup/recovery, performance monitor.
- Perform tests and evaluations regularly to ensure data security, privacy and integrity
- Monitor planning, development and troubleshooting
- Monitor performance and managing parameters to provide fast query responses to 'front end' users;
- Map out the 'conceptual design' for a planned database in outline;
- Refine the 'logical design' so that it can be translated into a specific data model
- Interact with user teams to understand project requirements
- Minimize database downtime and manage parameters to provide fast query responses
- Monitor and optimize the performance of the database
- Use high-speed transaction recovery techniques and backup data
- Provide proactive and reactive data management support and training to users
- Build database systems of high availability and quality depending on each end
- Establish and maintain sound backup and recovery policies and procedures
- Back up and restore databases.

- Maintain archived data
- Implement and maintain database security
- Create and maintain users and roles, assign privileges
- Perform capacity planning
- Plan growth and changes
- Ensure compliance with database vendor license agreement
- Modify the database structure, as necessary, from information given by database programmer
- Install and upgrade the database server and application tools.

Content manager At Main Campus:

- To oversee the content presented on websites.
- To make sure the website is working properly and respond to website feedback.
- To monitor the site's statistics, such as user demographics, traffic flow and search engine placement.
- To work with the site's content producers, determining the type, quality and quantity of content needed for the website.
- To proofreads new content
- To ensure that all documents meet established content standards and works with developers to assess any technical challenges in displaying the content.
- To ensure that content changes regularly and remains relevant
- To ensure content remains updated and relevant
- To post multimedia content on the website, including audio and videos; and optimize photos for online publishing;. T o create banners, images, promotions etc for display on the website
- To generate and update website content

Web Programmer At Main Campus:

- To build and maintain websites and web applications to meet their client's needs.
- To write well designed, testable, efficient code by using best software development practices
- To create website layout/user interface by using standard practices
- To integrate data from various back-end services and databases
- To gather and refine specifications and requirements based on technical needs
- To create and maintain software documentation
- To maintaining, expanding, and scaling web site
- To use emerging technologies/industry trends and apply them into operations and activities
- To work with web content managers to match visual design intent
- To perform user testing or usage analyses to determine web sites' effectiveness or usability.
- To Fix errors or issues on the websites in a timely manner
- To coordinating repair of broken links

Server Administrator At Main Campus:

- To oversee the performance and condition of multiple servers
- To design, install, administer, and optimize servers hardware and software and related components to achieve high performance
- To oversee the physical security, integrity, and safety of the data center/server farm.
- To ensure the availability of client/server applications,
- To develop processes and procedures for ongoing management of the server environment
- To Monitor server performance

Server Administrator At Main Campus:

- To design, organize, modify, install, and support University's computer systems
- To install and maintain network server hardware and software.
- To administer desktop computers, printers, phones, personal digital assistants, smart-phones, software deployment, security updates and patches.
- To test and re-test parts to ensure they work properly.
- To identify and isolate defects.
- To integrate components into the final design.
- To estimate cost, reliability, and safety factors.
- To generate specifications for parts.
- To build, test and modify product prototypes.
- To analyze information and recommend appropriate hardware
- To specify power supply requirements and configuration.
- To retrieve data for analysis of system capabilities.

Network Engineer at Main Campus

- To design, implement, maintain, and support network infrastructure.
- To configure and install various network devices and services (e.g., routers, switches, firewalls, load balancers, VPN, QoS)
- To perform network maintenance and system upgrades including service packs, patches, hot fixes and security configurations
- To monitor performance and ensure system availability and reliability
- To monitor system resource utilization, trending, and capacity planning
- To provide Level-2/3 support and troubleshooting to resolve issues
- To work within established configuration and change management policies to ensure awareness, approval and success of changes made to the network infrastructure
- To select and implement security tools, policies, and procedures in conjunction with the organization's security team
- To liaise with vendors and other IT personnel for problem resolution

Database Programmer at Main Campus

- To perform database programming for new and existing systems.
- To write scripts, stored procedures and functions for database system.
- To perform quality assurance tests for ensuring data integrity and quality.
- To resolve database problems, queries and error reports in accurate and timely manner.
- To coordinate with team members to perform database programming based on project requirements.
- To assist in planning and implementing the data integration and data migration activities.
- To provide valid inputs in database architectural discussions.
- Assist in identifying process improvements for database performance, reliability and stability.
- To troubleshoot complex database issues in a timely fashion.
- To provide programmatic guidance and support to team members when needed.
- To provide project updates and metrics to Managers on regular basis.
- To assist in preparing database functional and design specifications.
- To test database systems and perform bug fixes.
- To maintain accurate and complete database programming documentations.
- To design and implement database in accordance to end users information needs and views
- To implement and control security procedures to protect the database from accidental or intentional damage or loss

System manager at Regional and Sub-Regional Center

- Overall responsibility of ICT services at Center and center's jurisdiction

Programmer at Regional and Sub-Regional Center

- To perform database programming and system programming
- To troubleshoot complex database issues in a timely fashion.
- To provide programmatic guidance and support to team members when needed.
- To maintain accurate and complete database programming documentations
- To implement and control security procedures to protect the database from accidental or intentional damage or loss
- To create and maintain software documentation
- To back up or modify applications and related data to provide for disaster recovery.
- To test issues such as system integration, performance, and system security on a regular schedule or after any major program modifications.

HW/Network Engineer at Regional and Sub-Regional Centre

- To design, implement, maintain, and support network infrastructure.
- To configure and install various network devices and services
- To select and implement security tools, policies, and procedures in conjunction with the organization's security team
- To design, organize, modify, install, and support organization's computer systems
- To install and maintain network server hardware and software.
- To administer desktop computers, printers, phones, personal digital assistants, smart-phones, software deployment, security updates and patches

Data Entry Operator at Main campus, Regional and Sub-Regional Center

- To enter data from source documents into prescribed computer database, files and forms within time limits
- To compile, verify accuracy and sort information according to priorities to prepare source data for computer entry
- To transcribe information into required format
- To scan documents into document management systems or databases
- To review data for deficiencies or errors, correct any incompatibilities if possible and check output
- To make Necessary Changes or Corrections
- To apply data program techniques and procedures
- To generate reports, store completed work in designated locations and perform backup operations
- To maintain logbooks or records of activities and tasks
- To respond to requests for information and access relevant files
- To comply with data integrity and security policies

Annexure B

BRANCH	AHMEDNAGAR	AKOLA	AMRAVATI	AURANGABAD	BEED	BHANDARA	BULDHANA	CHANDRAPUR	DHULE	GADCHIROLI	GONDIA	HINGOLI	JALGAON	JALNA	KOLHAPUR	LATUR	MUMBAI CITY	MUMBAI (SUB)	NAGPUR	NANDED	NANDURBAR	NASHIK	OSMANABAD	PARBHANI	PUNE	RAIGAD	RATNAGIRI	SANGLI	SATARA	SINDHUDURG	SOLAPUR	THANE	WARDHA	WASHIM	YAVATMAL	Grand Total
MECH.	1740	165	1080	2100	180	210	660	420	600	60		60	1200	120	2520	360	300	915	4320	300	120	2640	480	120	14140	1575	420	1920	1104	180	1950	1920	780	180	570	45409
COMP	1050	225	1740	1290	270	330	570	370	600	60		60	780	60	1500	420	1836	1725	4590	420	120	1950	360	60	11890	1185	360	810	702	180	1230	2470	750	180	570	40713
ETRON	1080	150	1260	1410	210	420	540	330	480	60		60	750	60	1620	360	1596	1725	5400	360	120	1500	420	60	9000	1230	360	960	804	240	1440	2400	900	120	510	37935
CIVIL	1020	165	780	1170	180	180	240	480	360	60		60	510	60	1560	300	180	360	2100	180	120	1380	240	60	5190	930	120	780	522	120	840	1020	600	120	360	22347
ELEC	480	105	660	960	120	60	360	300	180	60		60	480	30	540	240	180	150	2760	90	120	1440	60		1980	420	180	600	300	60	480	420	360	60	180	14475
PHARMA	480	60	120	540	240	60	360	120	660		60		240	180	300	420	318	240	510	160	180	1080	60		2520	240	160	360	600	60	300	420	180	60	120	11408
CHEM	60	60	45	114			45						135		180		141	120	198	30		120			570	120	120	60			60	120			60	2358
INSTRU	30		60		60			40					60					120		40	60	40	30		390	60	60	60				240				1350
HMCT	30		15		60								15		60		16	180	172			40			360											948
ARCH.			20	180											60			120	150			60			180	60			60							890
TEXT.							45		60						210		94			30																30	469
OTHERS																									60											60
Grand Total	5,970	930	5,780	7,764	1,320	1,260	2,820	2,060	2,940	300	60	300	4,170	510	8,550	2,100	4,661	5,655	20,200	1,610	840	10,250	1,650	300	46,280	5,820	1,780	5,550	4,092	840	6,300	9,010	3,570	720	2,400	178362

Perspective Plan 2017-2021

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