# Annual Quality Assurance Report (AQAR)

Submitted to

# National Assessment and Accreditation Council (NAAC)



Academic Year: 2017 - 18

Submitted by



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## The Annual Quality Assurance Report (AQAR) of the IQAC

All NAAC accredited institutions will submit an annual self-reviewed progress report to NAAC, through its IQAC. The report is to detail the tangible results achieved in key areas, specifically identified by the institutional IQAC at the beginning of the academic year. The AQAR will detail the results of the perspective plan worked out by the IQAC. (*Note: The AQAR period would be the Academic Year. For example, July 1, 2012 to June 30, 2013*)

Part – A

### I. Details of the Institution

1.1 Name of the Institution	Vel Tech Rangarajan Dr. Sagunthala R & D Institute of Science and Technology		
1.2 Address Line 1	# 42, Avadi –Vel Tech Road		
Address Line 2	Avadi		
City/Town	Chennai		
State	Tamil Nadu		
Pin Code	600 062		
Institution e-mail address	vtu@veltech.edu.in		
Contact Nos.	044-26840099		
Name of the Head of the Institution:	Dr. V. Ramachandran Vice Chancellor		
Tel. No. with STD Code:	044-26840099		
Mobile:	08754416291		
Name of the IQAC Co-ordinator:	Dr. A. Abudhahir		
Mobile:	09940226524		

IQAC e-mail address:

1.3 NAAC Track ID (For ex. MHCOGN 18879) OR

1.4 NAAC Executive Committee No. & Date: (For Example EC/32/A&A/143 dated 3-5-2004. This EC no. is available in the right cornerbottom of your institution's Accreditation Certificate)

1.5 Website address:

Web-link of the AQAR:

diaq@veltech.edu.in

EC/ 71/ A&A/ 23.1 dated 16.11.2015

www.veltech.edu.in

http://www.veltech.edu.in/wpcontent/uploads/2018/12/AQAR2017\_18.pdf

#### 1.6 Accreditation Details

Sl. No.	Cycle	Grade	CGPA	Year of Accreditation	Validity Period
1	1 <sup>st</sup> Cycle	А	3.17	2015	5 years (16.11.2015 to 15.11.2020)
2	2 <sup>nd</sup> Cycle				
3	3 <sup>rd</sup> Cycle				
4	4 <sup>th</sup> Cycle				

1.7 Date of Establishment of IQAC :

DD/MM/YYYY

09.09.2013

1.8 AQAR for the year (for example 2013-14)

2017 - 18

1.9 Details of the previous year's AQAR submitted to NAAC after the latest Assessment and Accreditation by NAAC ((for example AQAR 2010-11submitted to NAAC on 12-10-2011)

- i. AQAR 2015-16 submitted to NAAC on 07.02.2017
- ii. AQAR 2016-17 submitted to NAAC on 03.04.2018
- iii. AQAR\_\_\_\_\_\_(DD/MM/YYYY)
- iv. AQAR\_\_\_\_\_\_(DD/MM/YYYY)

1.10 Institutional Status

University	State Central Deemed 🖌 Private
Affiliated College	Yes No
Constituent College	Yes No
Autonomous college of UGC	Yes No
Regulatory Agency approved Institution (eg. AICTE, BCI, MCI, PCI, NCI)	Yes 🗸 No
Type of Institution Co-education $\checkmark$	Men Women
Urban	Rural 🖌 Tribal
Financial Status Grant-in-aid	UGC 2(f) UGC 12B
Grant-in-aid + Self Fi 1.11 Type of Faculty/Programme	nancing Totally Self-financing
Arts Science 🗸	Commerce 🖌 Law PEI (Phys Edu)
TEI (Edu) Engineering	✓ Health Science Management ✓
Others (Specify)	
1.12 Name of the Affiliating University (for	r the Colleges) Not Applicable
1.13 Special status conferred by Central/ Stat	te Government UGC/CSIR/DST/DBT/ICMR etc
Autonomy by State/Central Govt. / University	
University with Potential for Excellence	UGC-CPE

DST Star Scheme	TBI- NIDHI -COE	UGC-CE		
UGC-Special Assistance Programme		DST-FIST		
UGC-Innovative PG programmes		]		GTD
UGC-COP Programmes		Any other ( <i>Specify</i> )	Recognition of D SIRO valid f 28.01.14 to 31.03.1 01.04.16 to 31.03.19	SIR from 6 & 9
2. IQAC Composition and A	<u>ctivities</u>			
2.1 No. of Teachers		8		
2.2 No. of Administrative/Technical staff		6		
2.3 No. of students		1		
2.4 No. of Management representatives		1		
2.5 No. of Alumni		1		
2. 6 No. of any other stakeholder and com	nmunity repres	entatives 1		
2.7 No. of Employers/ Industrialists		1		
2.8 No. of other External Experts		1		
2.9 Total No. of members		22		
2.10 No. of IQAC meetings held		4		
2.11 No. of meetings with various No stakeholders:	p. 16	Faculty 8	Non-Teaching Staff	2
S	tudents 4	Alumni 2	Others	-
2.12 Has IQAC received any funding from	uGC during t	the year? Yes	No 🗸	
If yes, mention the amount				

2.13 Seminars and Conferences (only quality related)

(i) No. of Seminars/Conferences/ Workshops/Symposia organized by the IQAC

Total Nos.	56 Interna	ational   3   National   34   State   7   Institution Level   12
	(ii) Themes	Outcome Based Education
		CDIO Curricular Framework, Syllabus & Standards
	Active Learning	
		Teaching Learning Quality
		Integrated Curriculum
		Entrepreneurial skill development
		Accreditations & Ratings

2.14 Significant Activities and contributions made by IQAC

#### Academic Initiatives

**CDIO curricular framework:** Integrated courses – Introduction to Engineering, Design Thinking, Mathematics, Applied Statistics, Technical English, IO based practical courses, CDIO based projects

**Independent Learning and Complementary Skill courses:** MOOC courses and Skill Certification courses; participation in various co-curricular and extra-curricular activities

**OBE based Student Assessment:** Quality of the question paper and assessment & evaluation enhanced

Course progression monitoring thro' CC/ MC meetings: Improvements seen in Syllabus portion coverage, Quality of teaching-learning, Open-ended assignment and laboratory experiments

V – Learn Course Management: CBCS, Course registration, Student attendance, course eligibility, assignment submission, continuous assessment, course material sharing made transparent and accessible real-time

**OBE based Feedback & Academic Audit:** Improvement in Quality of academic process and documentation. Slow learners facilitated for better attainment of learning outcomes.

**CDIO based Programme Assessment:** Areas of strengths and weaknesses of the programme identified and action initiated for further improvement

#### Faculty Centered

**Teaching Developers Forum:** About 40% of the faculty members employ active learning methods for about 20% of the syllabus topics instruction; Engineering Hives

**Faculty core competency thro' FDPs:** About 60% of the faculty attended FDPs organised by reputed institutions – Improvement in teaching-learning and assessment

**Research promotion policy:** Improvement in both quantity and quality of publications, sponsored research project proposal submission and number of Ph.D guidance

**Compliance based Faculty Appraisal:** Significant improvement noticed among the faculty in relation to contribution in the department

#### Student Mobility through Academic Flexibility

**Programme Transfer:** Changing the programme at any time of study based on their interest fulfilling the requirements

**International/ Industry Internship:** About 90% of the students underwent IPT/ Internship and 70% of the students carried out their major project in industries; About 120 students pursued credit courses and international internships

#### **Students' Employability**

**Employability enhancement thro' Industry Engagement:** Credit courses delivery, course development, project guidance etc. by industry personnel. Students shown interest in core engineering placement.

#### Accreditation & Ranking Initiatives

**Benchmarking through Accreditation and Rankings:** Areas which need improvements are identified and strategies are devised towards implementation. NBA, NAAC, NIRF, Times Higher Education, ABET, IET, QS I-Gauge etc.

**Induction cum Acquaintance Programme:** Created lot of interest in engineering among the students to pursue engineering, develop projects during first year itself and participate in project contests

#### 2.15 Plan of Action by IQAC/Outcome

The plan of action chalked out by the IQAC in the beginning of the year towards quality enhancement and the outcome achieved by the end of the year \*

Plan of Action	Achievements
<ul> <li>NBA <ol> <li>Second Cycle for NBA accreditation for two B. Tech programmes namely;</li> <li>Mechanical Engineering</li> <li>Aeronautical Engineering</li> </ol> </li> <li>Getting NBA accreditation for four B. Tech programmes namely;</li> <li>Automobile Engineering</li> <li>Civil Engineering</li> <li>Computer Science and Engineering</li> <li>Electronics and Communication Engineering</li> </ul>	<ul> <li>NBA <ol> <li>Received Accreditation for three years valid from 2017-18 to 2019-20</li> </ol> </li> <li>SAR Submitted to NBA</li> </ul>
Applying for NAAC Re-assessment	Institutional Information for Quality Assessment (IIQA) Submitted and Approved by NAAC
<ul> <li>Rankings / Ratings</li> <li>1. To participate in NIRF India Rankings 2018</li> <li>2. To participate in Times Higher Education (THE) World University Rankings 2018</li> <li>3. QS Stars</li> </ul>	<ul> <li>Rankings / Ratings <ol> <li>NIRF</li> <li>77<sup>th</sup> position in Engineering</li> <li>101 – 150 band in University level.</li> </ol> </li> <li>Participated in Times Higher Education (THE)</li> <li>QS I-GAUGE Rating (Initial &amp; Critical data submitted)</li> </ul>
Revision of curriculum for Management programmes.	Revised
Obtaining AICTE approval for all Programmes	Obtained AICTE approval for 10 UG Engineering programmes, 19 PG Engineering programmes, MBA programme and Ph.D programmes for the Academic Year 2018-19
Placing more students in product based IT companies and Core Engineering companies	Considerable improvement product based IT companies but not significant improvement in core Engineering companies
Offering more number of skill oriented courses by industry experts	26 courses (One credit) offered by experts from 24 Industries
Six month/ One-year internship for the students	35% of the final year students underwent six month/ one-year internship
Establishing industry collaborated labs	Established Vehicle Control System lab in collaboration with WABCO Established Artificial Intelligence/ Deep Learning centre in collaboration with NVIDIA

Exploring optimal carrier paths for students through flexible academics and CBCS	More than 250 students earned the required credits (except major project) in six semesters and intensive semester, and ready for one-year internship to explore their career after graduation.		
Enhancing faculty Internship in industries and institutes of repute abroad	Faculty were sent for industry internship and institutes of repute abroad		
<ul> <li>Curriculum and Teaching-Learning         <ul> <li>Combining Introduction to Engineering, FME Project and Engineering Practices Laboratory as a single Integrated Course focusing on Engineering skills.</li> <li>60% of the course delivery through Active Learning Methods.</li> </ul> </li> <li>Establishing workspaces in Engineering departments for carrying out mini &amp; capstone projects.</li> </ul>	<ul> <li>Introduction to Engineering Course (3 credit) was designed and experiences were shared in CDIO international conference at University of Calgary.</li> <li>About 50% of the faculty employed Active Learning Methods for few of the course topics in the syllabus.</li> <li>Engineering workspaces were established in CSE &amp; ECE for design-build experience projects.</li> </ul>		
Complimentary Skill Courses	Improved performance in the Aptitude tests		
Special Training Courses	And subsequent rounds of Interviews where Quantitative, Verbal and Logical skills are		
Company Specific Trainings	examined.		
2.16 Whether the AQAR was placed in statutory body	Yes V No		

Management	✓	Syndicate	Any other body	
39 <sup>th</sup> BoM held on			•	
17.11.18				

# Part – B

# Criterion – I

# I. Curricular Aspects

1.1 Details about Academic Programmes

Level of the Programme	Number of existing Programmes	Number of programmes added during the year	Number of self-financing programmes	Number of value added / Career Oriented programmes
PhD	13	1	14	0
PG	19	5	24	0
UG	12	3	15	0
PG Diploma	0	0	0	0
Advanced Diploma	0	0	0	0
Diploma	0	0	0	0
Certificate	0	0	0	0
Others	0	0	0	0
Total	44	9	53	0
Interdisciplinary	0	0	0	0
Innovative	0	0	0	0

1.2 (i) Flexibility of the Curriculum: Yes (CBCS/ Core/ Elective option / Open options)

(ii) Pattern of programmes:

	Patte	Pattern		Number of programmes				
	Seme	Semester		39				
	Trime	ester		0				
	Ann	ual		0				
1.3 Feedback from stakeholders* (On all aspects)	Alumni	✓	Parents	✓	Employers	✓	Students	✓
Mode of feedback	Online	~	Manual	~	Co-operatin	g school	ls (for PEI)	
1.4 Whether there is any revision/up	date of reg	gulatio	on or sylla	bi, if y	es, mention th	neir salie	ent aspects.	

Yes,

Once in six months BoS meetings are held for each department to revise/ update the syllabi based on the programme stakeholders (Faculty, Student, Alumni, Industry Experts, Employers, Parents, Local Society, Professional Society etc.) input.

Each department maintains the Minutes of the BoS meetings.

1.5 Any new Department/Centre introduced during the year. If yes, give details.

Yes. Biomedical Engineering, Biotechnology and BBA

# **Criterion – II**

## 2. Teaching, Learning and Evaluation

2.1 Total No. of permanent faculty	Total	Asst. Professors	Associate Professors	Pro
	519	392	80	
2.2 No. of permanent faculty with Ph.D.	155			
	As	sst. Associa	Professors	Othe

2.3 No. of Faculty Positions Recruited (R)
and Vacant (V) during the year

2.3 No. of Faculty Positions Recruited (R)	As Profe	st. ssors	Assoc Profes	ciate ssors	Profe	ssors	Oth	iers	Tot	al
and Vacant (V) during the year	R	V	R	V	R	V	R	V	R	V
		152	16	16	11	11	0	0	205	179
2.4 No. of Guest and Visiting faculty and Temporary faculty				1	43	2	26		0	

fessors

47

Others

2.5 Faculty participation in conferences and symposia:

No. of Faculty	International level	National level	State level
Attended	14	92	45
Presented papers	46	10	2
Resource Persons	10	02	2

2.6 Innovative processes adopted by the institution in Teaching and Learning:

#### Processes followed to improve quality of Teaching & Learning

#### Adherence to Academic Calendar

- Institution Academic Calendar is prepared well in advance before the start of academic year which • is disseminated through website.
- The academic calendar provides date of commencement of the academic session, duration of • semester, period of continuous internal assessments, end semester examinations and last instructional day.
- The academic calendar also highlights winter & summer vacation and State Government holidays.
- Adhering to academic calendar, course instructors / coordinators prepare course plan and • Teaching-Learning materials well in advance, conduct continuous assessment and evaluation, and maintain analytic records of courses.
- Course instructors are given freedom of conducting seminars, assignments, quiz and assessments as desired by faculty during the working days.
- Progress of each course is monitored by Course / Module coordinators through series of seven • meetings with the presence of theory course handling faculty members and Head of the

Department (scheduled based on academic calendar) in a semester with well-defined agenda points for each meeting to ensure the execution of lesson plan. The schedule for theory course/module coordinators meeting is shown in the following table.

Neeting No.	Schedule	Important points to be discussed
1	Conducted before the	Content delivery and assessment methods, Lecture plan,
	after course allocation is done	Identification of the requirement of learning resources.
2	Conducted after 15 days of the first meeting	Verification of 1 <sup>st</sup> unit Course materials as per course plan, Discussion on the preparation of Assignment sheets, Question Bank for competitive exams / GATE etc., the readiness of Course Orientation Presentation / material.
3	Conducted after the completion of first unit as per academic calendar	Verification of completion of syllabus with respect to the lesson plan, Course materials for the unit –II & III; Analysis of Students Performance in Unit Test-1, Online Students' feedback and any other issue.
4	Conducted after the completion of second unit as per academic calendar.	Verification of completion of syllabus with respect to the lesson plan, Course materials for the unit –IV & V; Analysis of Students Performance in Assignments.
5	Conducted after the result announcement of Mid Term test -1	Analysis of Midterm Test -I performance, Attainment of Course outcomes based on the Unit Test-1, Midterm Test-1 and assignment
6	Conducted after the completion of fourth unit as per academic calendar	Verification of completion of syllabus with respect to the lesson plan, Analysis of Students Performance in Unit Test 2, Online Students' feedback and any other issue, Discussion on the Design of Course exit survey to be deployed at the end of the semester.
7	Conducted after the declaration of end semester exam results	Analysis of Course Outcome attainment based on the Direct Assessment and Course exit survey, Identification of the changes / improvements to be brought in terms of course content / syllabus and content delivery based on the Course Outcome attainment / Course exit survey. Discussion on the identification of the faculty "FDP" requirements based on the Course Outcome / course exit survey attainment level. Reviewing on the Quality of CIA and End semester Examination Question papers.

#### Theory Course/Module Coordinators Meeting Schedule

#### Improving Instruction Methods using Pedagogical Initiatives

Because of technological advancements and subsequent cultural changes, now days, bringing and retaining the engineering students in the conventional classrooms is a big challenge prevailed

internationally. The solution, pronounced by the learning scientists, is Teaching learning should be transformed as **Learning by facilitation** which happens in a space wherein students will learn actively with peers. The department has taken pedagogical initiatives for improving instruction methods as follows:

- All the faculty members have been attending the Workshops and training programmes on Outcome Based curriculum design, Teaching-Learning and Assessment & Evaluation regularly and practicing the same for their courses.
- **Teaching Developers Initiative (TDI)** is a forum which has been functioning in our institute to create an encompassing movement towards enhancing the teaching skills through faculty peer learning to fit themselves for Z-Gen students of 21st Century.
- The department has conducive-academic eco system to facilitate student learning activities such as active learning spaces and faculty members have been facilitating students towards **collaborative and cooperative learning** through
  - Active Learning Environment
  - Problem based learning
  - Project based learning
  - One day industrial visits
  - Case study
  - Other methods like Jig-saw, Think-Pair-Share, Peer Instruction,
  - Concept Test, Mud card and flipped classroom
  - ICT enabled e-Learning
  - Project Expo
- Faculty members deliver the course using appropriate instructional methods which include active learning methods in order to attain the course outcomes. Continuous assessment and evaluation methods such as tests, assignments, seminar, course end survey etc., are employed to measure the attainment of each course outcome.
- About 20-30% of the topics in the syllabus of each subject are delivered through active learning methods.
- E-learning resources including video lectures engage the students in Independent and life-long learning.
- To enhance teaching-learning further through ICT, the institute provides Wi-Fi internet facility (24X7) that are accessible to all students, faculty & staff. The ICT facilities for teaching learning include Smart classrooms, Video conference facility, Wi-Fi enabled campus/hostels, NPTEL, MIT open courseware, Language communication lab, Virtual laboratories, Knowledge Resource Center (KRC).
- The Academic Regulations of the Institution have the following provisions to enhance the students' learning apart from classroom instruction provided to the students.
  - Independent Learning
  - Seminar, Minor Project and Major Project
  - Industry/Higher Learning Institute Interaction
  - o Internship
  - Specialized Courses
  - Complementary Skill Courses
  - Skill based Vocational Courses
  - In-plant training
  - Internships

#### **Quality of Laboratory Experience**

Laboratory classes are intrinsic part of an engineering course and its experiences will enhance our students as independent learners, critical thinkers and researchers. The objectives for enhancement in laboratory experiences are augmenting understanding of course content, developing practical skills, improving scientific reasoning and enhancing teamwork abilities. Primarily it is an improvement with regard to conducting an experiment, recording observations and analyzing an experimental data. The department follows certain procedures to improve the quality of laboratory experiences as follows:

#### Laboratory Course/Module Coordinators Meeting

Progress of each laboratory course is monitored by Course / Module coordinators through series of three meetings with laboratory course handling faculty members and Head of the Department (scheduled based on academic calendar) in a semester with well-defined agenda points for each meeting to ensure best laboratory experiences. The schedule for laboratory course/module coordinators meeting is shown in Table given below.

Meeting No.	Schedule	Important points to be discussed
1	Conducted before the commencement of semester after course allocation is done	Reviewing of the experiments. Modifying the experiments (should record the modifications with reason). Frame the experiments such that at least one experiment must be a design experiment. Verification of lab course outcomes and lab manuals. Identification of infrastructure facilities and other requirements.
2	Conducted after the model practical examination- 1	Action taken report of the previous meeting. Verification of lab observation book and records books. Verification of model exam-1 results, other assessment analysis and outcome analysis Feedback from students. Follow up of lab experiments, identification of gaps and rectification.
3	Conducted after the result declaration of end semester exam	Action taken report of the previous meeting. Verification of lab observation book and records books. Feedback from students. Verification of university exam result, model exam result, model exam results, other assessment analysis and outcome analysis. Identification of gaps and rectification. Servicing of the equipment's and replacements if any.

#### Laboratory Course/Module Coordinators Meeting Schedule

2.7 Total No. of actual teaching days during this academic year

180

2.8 Examination/ Evaluation Reforms initiated by the Institution (for example: Open Book Examination, Bar Coding, Double Valuation, Photocopy, Online Multiple Choice Questions)

The assessment of student performance is carried out through a combination of internal and external evaluation.

#### Regulation 2009 & 2013

#### (a) Continuous Internal Evaluation:

Aiming to assess values, skills and knowledge imbibed by students, internal assessment is done by the concerned faculty-member of the Department in concerned School.

- For all theory, practical courses other than project work, the continuous internal assessment will carry 40 marks (consisting of 35 marks for tests/experiments, assignments, sports, NCC, NSS, attending seminars, symposium, presenting or publishing papers, participation in any such co-curricular or extra- curricular activities and 5 marks for attendance) while the University examination will carry 60 marks).
- For project work, the continuous internal assessment will carry 100 marks while the University examination will carry 100 marks. The project work shall be consolidating for a maximum of 400 marks.
- The system of awarding marks under the Continuous Internal Assessment has been made transparent and amenable to measurement and verification. Hence once CIA has been made and marks awarded, it is frozen against 40 marks. However, in order to improve one's University end semester examination marks, every student has one opportunity to choose to appear for an Improvement Examination. If for any reason a student has secured low marks in the CIA out of 40 marks, unless he secures 40 out of 60 in the end semester University Examination, he will not be able to clear the subject. Hence in order to remove this difficulty, the facility that is offered to immigrant students shall be extended to the regular students also.
- Information on schedule of Internal examinations are mentioned in the Academic Calendar

#### (b) End-End Semester Evaluation:

- Information on Date of Commencement of Term End Examinations are mentioned in the Academic Calendar (Both Laboratory and theory courses)
- University Term End examinations Time Table are announced 2 months in advance from the commencement of the Term End Examinations
- One question paper prepared by the internal examiner and 2 question papers are received from external examiners for each and every course, out of which one question paper is randomly chosen.
- For Laboratory courses, external examiners from reputed institutions along with the internal examiner conducting the term end examinations.
- In order to lessen the burden of accumulating arrears, supplementary examinations will be held by the University in the middle of every semester.
- The University examination for project work shall comprise of evaluation of the final report submitted by the project group (of not exceeding 4 students) by an external examiner followed by a viva-voce examination conducted separately for each student by a committee consisting of the external examiner, the guide of the project group and an internal examiner.
- The project report shall carry a maximum 50 marks (same mark awarded to every student of the project group) while the viva-voce examination shall carry 50 marks (awarded to each student of the project group based on the individual performance in the viva-voce examination).
- A candidate who secures not less than 50% of total marks prescribed for the courses with a minimum of 50% of the marks prescribed for the Annual examination of First year (Annual

pattern) / end-semester University Examination in both theory and practical courses (including Project work), shall be declared to have passed the Examination.

• For the University examination in both theory and practical courses including project work the internal and external examiners shall be appointed by the Controller of Examination of the University.

#### (c) Integration of Continuous and End-of-semester Evaluation

- The performance of each student in each of the courses of studies shall be evaluated on a Continuous Internal Assessment and through University examinations at the end of each semester.
- Individual grade sheets for each semester will be issued, containing the following information through the Dean concerned, after the publication of the results duly authorized by the Controller of examinations.
- The following information will be furnished for each course in the grade sheet, which will be supplied to each candidate who had registered for an examination conducted by the University:
  - Course Code
  - Course Title
  - Credits (Cr)
  - Grade obtained
  - Month and year of pass
  - SGPA for every semester
  - CGPA till the current semester
  - The total marks obtained (CIA+ ESE) shall be considered for awarding the grade.
- *Grade Points and Letter Grade for a Course:* The grade points and letter grade shall be awarded to student in each course based on his/her performance as per the grading system shown in following Table

Range of Marks	Letter Grade	Grade Point
90-100	S	10
80-89	Α	9
70-79	В	8
60-69	Č	7
50-59	D	6
00-49	RA	0
Absent	AB	0

Table 2. Grade points and letter grade scheme for a course

• Semester Grade Points Average (SGPA): It is a measure of performance of work done in a semester. It is the ratio of sum of product of credit and grade point earned by a student in various courses in a semester and the sum of the credits earned in that semester. It shall be expressed up to two decimal places and shall be computed using the formula given below.

$$SGPA = \frac{\sum_{i=1}^{n} C_i G_i}{\sum_{i=1}^{n} C_i}$$

where  $C_i$  denotes the credit earned in the i<sup>th</sup> course, n is the number of courses through which credits earned by a student in a semester and  $G_i$  is the Grade Points

secured by a student in the i<sup>th</sup> course. SGPA shall be mentioned in the grade sheet as per the format below.

Total credits registered Total credits registered	Total credits registered
---	--------------------------

• **Cumulative Grade Point Average (CGPA):** It is a measure of cumulative performance of a student in a programme. The CGPA is the ratio of sum of product of credit and grade point earned by a student in various courses in all the semesters and total credits earned in all the semesters. It shall be expressed up to two decimal places and shall be computed using the formula given below.

$$CGPA = \frac{\sum_{i=1}^{m} C_i G_i}{\sum_{i=1}^{m} C_i}$$

Where  $C_i$  denotes the credit earned in the i<sup>th</sup> course, m is the number of courses through which credits earned by a student in all the semesters and  $G_i$  is the Grade Points secured by a student in the i<sup>th</sup> course.

- For conversion of CGPA (on 10-point scale) into percentage of marks a multiplication factor of 0.9 is used and then multiplies by 100 to get equivalent percentage of marks. Example: CGPA of 6.75 on 10-point scale = 6.75/10\*0.9\*100=60.75%
- A student shall be declared to be eligible for the award of the B.Tech. Degree provided the student has
  - (a) Successfully completed the course requirements and has passed all the prescribed examinations in 8 semesters (6 semesters for lateral entry) within a maximum period of 7 years (6 years for lateral entry) reckoned from the commencement of the first year to which the candidate was admitted; and
  - (b) The award of Degree must have been approved by the Academic Council and the Board of Management of the University.
- Challenge Evaluation:

In case the student does not satisfy even with the re-evaluation of his/her answer script, he/ she shall have provision to get his/her answer scripts to be re-evaluated in the presence of the student and any of his/her chosen academic experts. Upon the payment of required processing fee by the student, COE shall issue photo copy of the script and the student shall be allowed to bring any academic expert of his/her choice with him to the COE office for evaluating the answer script. One more external examiner shall be appointed by the COE with the approval of VC. The challenge evaluation shall be done in the presence of the student by the above two examiners. The average of both the examiners' mark is taken. The maximum marks obtained by the student among the original evaluation and challenge evaluation shall be taken as the final marks. If the difference of two evaluation marks exceeds 15, the processing fee shall be refunded to the student, provided he/she secures minimum pass marks for that course. In case the difference is within 15, the fee amount shall not be refunded.

#### PASSING REQUIREMENTS

A candidate who secures not less than 50% of total marks prescribed for the courses with a minimum of 50% of the marks prescribed for the end-semester University Examination in both theory and practical courses (including Project work), shall be declared to have passed the Examination. The Continuous Internal Assessment marks obtained by the candidate in the first appearance shall be retained and considered valid for all subsequent attempts till the candidate secure a pass.

#### **Regulation 2015**

#### (a) Continuous Internal Evaluation:

- Continuous Evaluation (CE) shall be conducted by the course handling faculty/ course coordinator all through the semester; it includes unit tests, midterm tests, assignments, projects and other means covering the entire syllabus/all the course outcomes.
- For all the theory courses, the continuous evaluation shall be for a maximum of 40 marks consisting of two unit tests, two mid-term tests, two assignments and regularity of students. The tests shall be conducted on the dates mentioned in the academic calendar and assignment submission dates shall be given by the course faculty.
- There shall be two unit tests each carrying 10 marks. Two-third of the best unit test mark and one-third of the other unit test mark shall be considered for continuous evaluation. It shall measure the knowledge of the students in understand and above levels as mentioned against the respective course outcomes, in cognitive learning domain, as per the revised Bloom's taxonomy. The test shall consist of two questions each carrying five marks.
- There shall be two mid-term tests each carrying 20 marks. Two-third of the best mid-term test mark and one-third of the other mid-term test mark shall be considered for continuous evaluation.
- In each laboratory course, model laboratory test shall be conducted for maximum of 25 marks on appropriate dates as mentioned in the academic calendar.
- For the integrated courses which have more than 50% credit contribution from lecture classes, the continuous evaluation shall be for a minimum of 40 marks consisting of two mid-term tests and one practical test.
- Mid-term Tests: There shall be two mid-term tests each carrying 20 marks.
- Practical Test: A practical test shall be conducted for maximum of 20 marks on appropriate dates as mentioned in the academic calendar.
- For project work, Head of the department shall constitute the Project Review Committee (PRC) consisting of two faculty members with diversified specializations and the project guide. Continuous evaluation for 40 marks shall be done.

#### (b) End-End Semester Evaluation:

- Semester End Examination (SE) shall be conducted by the Controller of Examinations at the end of a semester, as per the academic calendar and it includes a written examination for theory courses, and practical examination and viva voce for laboratory/project courses
- For all the theory, practical, and project courses, the semester end examination shall be for a maximum of 60 marks. For seminar, internship /industrial training and industry offered courses; the semester end examination shall be for a maximum of 100 marks.
- For the integrated courses which have more than 50% credit contribution from lecture classes, the semester end examination shall be conducted for a maximum of 60 marks as same as for theory courses.
- For evaluation of project works, Semester end Project Evaluation Committee (PEC) shall be constituted with three examiners; one member from PRC (Section 8.2.11) nominated by HoD, one member nominated by VC and project guide. For each student in a project team, the semester end evaluation for 60 marks shall be conducted on dates as mentioned in the academic calendar. Separate Rubrics shall be prepared and made available for semester end project evaluation. Average marks of Project Evaluation Committee members shall be scaled to 60 marks.

- For evaluation of seminars, Seminar Review Committee (SRC) shall evaluate the individual student for 100 marks based on the rubrics prepared for the purpose on date(s) as mentioned in the academic calendar.
- For evaluation of Industry/Higher Learning Institute Interaction courses, student shall submit the comprehensive report to the department within a week time after the completion of the internships. Two credits shall be awarded to the student who underwent either one spell of internship which has a minimum of ten days' duration with at least 8 hrs per day or two spells which have a minimum duration of five days each with at least 8 hrs per day. Based on the Rubrics prepared for the purpose, the report shall be evaluated for 100 marks by a threemember review committee constituted by the Head of the Department.

#### (c) Integration of Continuous and End-of-semester Evaluation

- A candidate shall be declared to have passed in individual theory/drawing course if he/she secures a minimum of 50% aggregate marks (continuous evaluation and semester end examination marks put together), subject to a minimum of 45% marks in the semester end examination.
- A candidate shall be declared to have passed in individual lab/project course, if he/she secures a minimum of 50% aggregate marks (continuous evaluation and semester end examination marks put together), subject to a minimum of 50% marks in the semester end examination.
- On passing a course of a program, the student shall earn assigned 38 credits for that course. A candidate shall apply for revaluation of his/her semester end examination answer paper in a theory course, within the stipulated time from the declaration of results, on payment of prescribed fee along with prescribed application to the COE.
- The criterion for award of division after the completion of programme as per Section 13.1 is as shown below.

Criteria for award of division

**CGPA** nominations Division

 $6 \le CGPA < 6.5$  Second Class

 $6.5 \le CGPA < 8$  First Class

 $CGPA \ge 8$  Distinction\*

\*All the courses contributing to CGPA shall be cleared in the first appearance.

<u>Consolidated Grade Card</u>: A consolidated grade card containing credits and grades obtained by the candidates shall be issued after completion of the four year B.Tech Programme.

- **MALPRACTICES:** The Dean of the school shall refer the cases of malpractices in Continuous Evaluation and Semester End Examinations to a Malpractice Enquiry Committee constituted by him/her for the purpose. Such committee shall follow the approved scales of punishment. The Dean of the school shall take necessary action, against the erring students based on the recommendations of the committee.
- *MIGRATION*: The University academic programme offers Choice Based Credit System and transfer of credits. Transfer of credits enables a student to transfer the credit earned by him in one school to another and from one institution to another.

#### SALIENT FEATURES OF THE EXAMINATION WING

#### GENERAL:

- The Examination Wing of VTU is located in the Ground Floor with adequate working space
- Office of the COE has enough space for conducting meetings and discussion with the staff regarding examination activities

- Well-equipped office rooms accommodating sections to look after different activities of the Examination Wing with required number of PC Systems, Printers with internet / Intranet facilities
- Flow Charts elucidating different functions carried out by the respective sections are displayed.
- Entry is restricted for the reasons of confidentiality. One-way Entry is provided in order to restrict the entry of unauthorized persons into the office of the COE and Examination Section.
- Well protected iron grill coverage is provided to ensure full proof safety and security.

#### PRE EXAMINATION WORK (GENERAL)

- The practice of issuance of Circulars pertaining to various Examination activities such as payment of fees, mode of payment of fee, last date for payment of fee etc.
- The Circulars are displayed on the notice Boards of the Departments and in the office of the Controller of Examinations (at least 20 days before the commencement of Examinations
- Sorting out of Examination applications branch wise after verification of the correctness of fee paid by the students for different course papers with the information of payment particulars provided by the Accounts Department
- o Preparation and finalization of Nominal Roll of Students branch wise and Register Number wise
- Preparation of Time Table giving scope to the students in such a way to conduct the current semester examinations in the Morning Sessions and for arrear examinations in the Afternoon sessions excluding Sundays and Govt. Holidays
- Display of Time Table in the official Website, official notice boards in the office of the Controller of Examinations two months before the commencement of Examinations
- Preparation of Hall ticket with photos of the students with complete details of the course papers registered by him and the dates of examinations of the course papers
- Preparation of Hall wise seating arrangement by allotting 25 students in each rook under the supervision of one Invigilator
- Each desk accommodates students of different branches sitting alternatively to avoid the possibility of copying.
- A Senior faculty will be appointed as Chief Superintendent by the Vice Chancellor who will assume charge of conduct of Examinations to make necessary arrangements for the smooth conduct of examinations
- Based upon the hall wise requirement of the Invigilators at the ratio of 1:25 (i.e. one invigilator for 25 students), the total requirement of total number of invigilators is arrived at and informed to the Examination coordinators of the Department
- The Dean will furnish the names of faculty members who can act as Invigilators based upon the requirement of the CoEs office.

#### PRE EXAMINATION WORK (with regard to processing of question papers)

- Constitution of Boards of Question Paper Setters from the Expert Panel duly approved by the Board of Studies
- Forwarding offers of appointment of Question Paper Setters with requisite materials for setting questions papers with instructions
- Setting two different question papers in a course paper by the External Experts having teaching experience of at least 5 years and one paper (Regulation A and B) / two papers (Regulation 2015) by the Internal Expert having teaching experience of at least 3 years.
- Receipt and Entry of Question Papers in the Stock book as when they are received
- Preservation of Question Papers / Question Paper keys / Schemes of evaluation and CDs containing the soft copies of question paper documents in the Strong Room under safe custody.

- Scrutiny of question papers by the Experts in the respective areas of specialization will take place.
- Random Selection of One question paper out of three set for each course by the Vice Chancellor.
- Taking print outs of approved question papers half an hour before the commencement of Examinations.
- Packing and sealing of question papers for storage in the strong room
- Handing over the question papers in a sealed cover to the Chief Superintendent for distribution to the Invigilators on the day of the examinations

#### CONDUCT OF EXAMINATIONS (Theory)

- The Chief Superintendent will be present at the CoE's office for duty half an hour before commencement of the Examination on each day.
- Opening of question paper covers in the presence of invigilators on the outer cover containing the undertaking/ certification that the question paper covers are ordered as per the procedure prescribed.
- Distribution of answer paper booklets and relevant question paper copies to the invigilators as per the register maintained by the Examination Wing
- Preparation of attendance sheets of the students in the Examination Hall by the Invigilators indicating the Name, Register Number, Serial Number of the answer paper booklet and signatures of students in the relevant columns, along with names of absentees
- Preparation and submission of Absentees Statements of students by the Invigilator concerned
- Appointment of Examination Monitoring Squad by the Vice Chancellor to see whether the Examinations are conducted in a free and fair manner
- Submission of Report of candidates who indulge in Examination Malpractices during the Examinations by the Examination Monitoring Committee / Chief Superintendent of Examinations
- Sealing of Hall wise answer paper booklets with the signature of the invigilator duly countersigned by the Chief Superintendent

#### SCANNING PROCESSES BEFORE VALUATION

- Generating Dummy Numbers course paper wise and maintenance of dummy number generation register by the scanning section.
- Scanning / printing Dummy Numbers with course codes of answer papers after shuffling the answer scripts of a particular course.
- Detachment of the top portions of the answer booklets which contain the Register Number-Dummy Number
- Packing and sealing of detached top portions of answer scripts in sealed covers according to date wise, course wise for verification, if any, at a later stage
- Preservation of top slips of answer papers at the compartmental cub boards (Pigeon hole almirah) specially designed for this purpose
- Storage of date wise answer paper booklets on the racks provided till they are taken up for scanning.

#### CONDUCT OF EXAMINATIONS (Laboratory)

- Obtaining the list of External Examiners for the practical examinations from the Deans
- Obtaining approval of the External/ Internal Examiners from the Vice Chancellor for conduct of practical examinations in different lab course papers
- Incorporating practical marks awarded to candidates for different practical oriented papers manually in the PC Systems connected to the Server.

#### POST EXAMINATION WORK

- Placing Comments/ complaints on the question papers set for different course papers received from the Heads of Departments to Moderation Committee for recommendations
- Appointment of Chief Examiners/ Examiners for evaluation from the panel of External Experts/ Internal Experts maintained in the office of CoE.
- Conveying recommendations of the Moderation Committee to the Chief Examiners for implementation of the same at the time of valuation
- Evaluation of answer scripts as per the Scheme of Valuation/ Keys by the Examiners
- Manual Entry of Marks by the Evaluators in the PC System through the software so as to transmit the marks to the server as and when the valuation work is completed
- Collection of answer scripts from the Examiners and transfer them to the scanning section by the staff of the examination wing on a daily basis.

#### SCANNING AFTER VALUATION

- Scanning of marks from the answer scripts to create dummy number Marks database.
- Comparing the scanned marks by the machine and manually entered marks by the examiners at the time of evaluation to find out discrepancies.
- Preparation of Mismatch Check List to indicate anomalies in the marks entered by the scanning machine and evaluators for further verification.
- Rectifications of anomalies of marks with the respective answer scripts.
- Matching of Dummy Numbers Marks.
- Rectification of unmatched Dummy Numbers and marks with the top portions of relevant answer scripts.
- Merging of Marks and Dummy Numbers.
- Incorporation of Grace Marks if any recommended by the Moderation Committee.
- Preparation of finalized Result copy duly verified and checked by the staff of the Examinations Section.
- Approval of Result copy by the competent authorities.
- Forwarding of Result Copies to the Departments and website for publication of results.
- Preparation, verification and printing of Marks statements.
- Preparation, verification and printing of Tabulated Marks Register. Each Volume has publication code (4 alphabets/ year/ serial Number).
- Where 4 alphabets are the first letters of the names of (1) Vice Chancellor, (2) Registrar and (3) Controller of Examinations and (4) April or November
- The Publication code therefore indicates the names of the Vice Chancellor, Registrar and Controller of Examinations holding the hierarchical official positions at the time of publication of results
- Preparation, verification and printing of permanent pass Register (PPR)
- Preparation, verification and printing of provisional Certificates
- Issuance of Transcript to the students on demand and on payment of prescribed fee
- Payment of Degree Certificates at the time of Convocation

#### GENERAL PROCEDURES AND PRACTICES

- Stock books for issuance of answer scripts and examination stationery items are maintained in the Examination Wing with periodical verification by the authorities
- Personal Register containing the details of receipt of communications/ letters etc. mentioning the current number of each communication/ letter with date of receipt, date of action taken, date of disposal etc. in the prescribed format as per "**Tottenham Office System**"

- Periodical Register containing the details of receipt of communications/ letters etc. mentioning the current number of each communication/ letter with date of receipt, date of action taken, date of disposal etc. in the prescribed format as per "**Tottenham Office System**"
- Drafting Notes for obtaining orders/ approvals from the authorities as per the procedure recommended in the **Tottenham Office System**
- Requests for issuance of authentication certificates certifying the qualifications of the passed out students of VTU received from the Government and other approved agencies in connection with placements / employment / promotion to such students are attended to and replies are sent to them then and there
- The organizational Chart demarking various activities of the staff of the Examination Wing has been displayed prominently in the office of the Controller of Examinations
- Flow charts to display the year wise percentage of passed out students are also kept distinctly
- Meetings connected with the Examinations activities are conducted very often and the minutes of the meeting are prepared in the prescribed format and submitted to the authorities
- The details of action taken on various items of the agenda of the meetings are also filed and Action Report is prepared then and there to the authorities for their perusal and approval

#### EXAMINATION DATA PROCESSING SYSTEM (ENTRY TO EXIT)

- Processing of Internal Marks of students based on Attendance/ Cycle Test / Unit Test/ Mid Term Tests
- Receipt of University Examination marks transmitted from the Scanning Section
- Exporting the transmitted file to the server after verification
- Merging of Internal and External Marks using software specially designed for this purpose
- Preparation of Check Lists for verification of mismatching and discrepancies
- Incorporation of Moderation Marks accordingly
- Preparation of sample Tabulated Mark Register (TMR) for verification and approval
- Preparation of Result Copy
- Preparation of finalized Tabulated Marks Register for passed out students
- Preparation of Permanent Pass Register for passed out students
- Preparation of Merit List

#### SECURITY FEATURES

- Possession of well protected iron grill frame work set up around the safety locker, cub boards containing question papers and other confidential documents to ensure security
- Log books, stock registers for handling confidential documents with signatures of the office staff are also maintained
- Taking print outs of approved question papers half an hour before the commencement of Examinations
- Packing and sealing of question papers for storage in the strong room
- Shredder to destroy yester years/ unused/ unwanted question papers and CDs after the formal approval of the authorities'
- Handing over the question papers in a sealed cover to the Chief Superintendent for distribution to the Invigilators on the day of the examinations
- 2.9 No. of faculty members involved in curriculum restructuring/ revision/ syllabus development as member of Board of Study/ Faculty/ Curriculum Development workshop 315

2.10 Average percentage of attendance of students

83%

2.11 Course/Programme wise distribution of pass percentage:

	Total no.	Division				
Title of the Programme	of students appeared	Distinction %	I %	II %	III %	Pass %
B. Tech - Aeronautical Engineering	47	25.5	46.8	-	-	72.3
B. Tech - Automobile Engineering	35	11.4	48.6	-	-	60.0
B. Tech - Civil Engineering	102	14.7	60.8	-	-	75.5
B. Tech - Computer Science and Engineering	189	35.4	53.4	-	-	88.9
B. Tech - Electronics and Communication Engineering	187	32.6	50.8	-	-	83.4
B. Tech - Electrical and Electronics Engineering	48	14.6	75.0	-	-	89.6
B. Tech - Electronics and Instrumentation Engineering	2	50.0	-	-	-	50.0
B. Tech - Information Technology	8	-	50.0	-	-	50.0
B. Tech - Mechanical Engineering	323	28.8	45.8	-	-	74.6
M. Tech - Aeronautical Engineering (Unmanned Aerial Vehicle)	4	50.0	50.0	-	-	100.0
M. Tech - Electronics and Communication Engineering (VLSI and Embedded System Design)	3	-	100.0	-	-	100.0
M. Tech - Embedded Systems and Technologies	9	-	77.8	-	-	77.8
M. Tech - Environmental Engineering	7	71.4	28.6	-	-	100.0
M. Tech - Internal Combustion Engines	28	64.3	28.6	-	-	92.9
M. Tech - Industrial Engineering	3	66.7	33.3	-	-	100.0
M. Tech - Information Technology	6	33.3	16.7	-	-	50.0
M. Tech - Machine Design	13	38.5	38.5	-	-	76.9
M. Tech - Measurements and Control	2	100.0	-	-	-	100.0
M. Tech - Metallurgical and Material Science Engineering	3	66.7	-	-	-	66.7
M. Tech - Network Engineering	7	42.9	28.6	-	-	71.4
M. Tech - Power Electronics	5	-	20.0	-	-	20.0

	Total no.	Division						
Title of the Programme	students appeared	Distinction %	I %	II %	III %	Pass %		
M. Tech - Thermal Engineering	2	-	100.0	-	-	100.0		
M. Tech - Electronics Engineering (Automotive Electronics)	5	40.0	-	-	-	40.0		
M. Tech - Construction Engineering and Management	5	40.0	60.0	-	-	100.0		
M. Tech - Structural Engineering	9	22.2	66.7	-	-	88.9		
Master of Business Administration	53	35.8	60.4	-	-	96.2		

2.12 How does IQAC Contribute/ Monitor/ Evaluate the Teaching & Learning processes:

#### ACADEMIC AUDIT

The Academic Audit, like more traditional program reviews, is a peer review process which includes a self-study and a site visit by peers from outside the institution. It emphasizes self-reflection and self-improvement in addition to compliance with predetermined standards.

#### PURPOSE OF ACADEMIC AUDIT

- To encourage departments or programs to evaluate their "various academic processes vis-à-vis their quality" the key faculty activities required to produce, assure, and regularly improve the quality of teaching and learning.
- To facilitate HoDs / Deans / Directors how faculty approach to academic decision making and how they organize their work, using the resources available to them and working collegially to provide a quality education in the best interests of the student learning.

#### **OBJECTIVES OF ACADEMIC QUALITY AUDIT**

- To assure that each course in the curriculum addresses, agreed upon content, that sound teaching practices are carried out appropriately and consistently, that assessments are conducted as planned, and that agreed upon plans to improve courses or the program as a whole are implemented by the concerned persons.
- To assure ourselves those other faculty activities affecting students, such as academic advisement, are being performed appropriately and consistently.
- To provide meaningful, timely feedback and recognition to faculty regarding how they are performing work related to the curriculum, teaching and learning, assessment, and other practices affecting students.
- To identify benchmarked best practices in quality assurance and use this information to improve how we assure that the work of the program is performed appropriately and consistently.
- To review our quality assurance practices periodically to see how they might be improved.

#### 1. ELEMENTS OF ACADEMIC AUDIT

The focal elements of the academic audit are:

- 1. Curriculum Design
- 2. Teaching-Learning

#### 3. Assessment and Evaluation

#### 1.1 Curriculum Design

The curriculum audit for any programme is a strategy for taking the programme towards excellence. It is one of the methods to assure the quality of graduates being produced.

The curriculum audit is conducted with the following purposes.

- Improve, expand, innovate, redesign, add value, reengineer and increase the scope of the education programme.
- Compare the provisions of curriculum and actual achievements and find out the gaps in respect of well-defined criteria.
- Assess the level of quality attainment in different phases of curriculum life cycle.
- Identify the difficulties in the implementation of the curriculum.
- Design and implement the curricular innovations.
- Assure the quality for the next cycle of the programmes.
- Compare the effectiveness of the programmes within the institution and among the institutions.
- To verify the extent of curriculum compliance to the guidelines of concerned Regulatory Authority.
- Assure the effective participation / involvement of external stakeholders in the curriculum design & revision.
- To verify the fulfillment of curriculum with the requirement of the Program Specific Criteria (PSC) of respective programme prescribed by appropriate professional / lead society.
- To verify the adequacy of the curriculum to address all the Program Outcomes of the respective programs.
- To verify the frequency of curriculum revision / syllabi modification.
- To analyse the summary of feedback of course handling faculty on courses & syllabi.
- To verify the Recommendations of BoS & Academic Council incorporated in the curriculum & syllabi.
- To verify the relevance of course outcomes with respect to the content.

#### **1.2 Teaching-Learning**

- To consciously consider the program outcomes and course outcomes to decide the teaching methods in our courses.
- To discuss our teaching practices with each other and work collaboratively to improve teaching and learning.
- To consult sources beyond our own faculty while selecting our teaching practices. (e.g., employers, students or graduates, comparable programs in other institutions, professional associations, etc.)
- To identify the best practices in teaching and use these information to improve our own teaching.
- To review periodically our teaching methods to see how they might be improved.
- To monitor the conduct of the meetings Course Coordinator / Module Coordinator as per the schedule.
- To follow-up action suggested in the Course Coordinator / Module Coordinator Meeting.

- To monitor the implementation of Innovative Teaching Learning / Active Learning Methods Attempted / Incorporated / Employed / Contemplated.
- To verify course file maintenance.
- To analyse students' feedback and follow-up action.

#### **1.3 Assessment and Evaluation**

- To measure the extent to which our students are achieving course outcomes and program outcomes
- To work collaboratively to develop and implement assessments of course outcomes and program outcomes.
- To consult sources beyond our own faculty when designing assessments of program learning objectives. (e.g., employers, students or graduates, comparable programs in other institutions, professional associations)
- To discuss assessment data and use our findings to improve our curriculum, co-curriculum and teaching practices.
- To identify the best practices in assessment of course outcomes and program outcomes and use this information to improve our assessments.
- To review periodically our assessment methods to see how they might be improved.
- To assess the fairness and transparency in the evaluation.
- To identify whether assessment has been conducted for the entire course outcomes and program outcomes.
- To identify the effectiveness of assessment methods.
- To verify the adequacy of laboratory spaces, equipment etc. for the conduct of experiments.

#### 2. AUDIT PROCESS – THE PEER REVIEW

- Auditors are primarily academicians who are trained on education quality processes and audit methodology.
- Audit team (2-4 members) most likely come from other institutions.
- Since the auditors focus on quality processes, they do not have to come from the academic discipline of the department being audited.
- Audit visits are typically one day per department.
- Auditors meet the departmental leadership, faculty, and students.
- Auditors write a report highlighting examples of exemplary practice, noting areas for improvement, and evaluating a department's approach to educational quality practices.

#### **3.** GUIDELINES TO AUDITOR(s) / AUDITEE(s)

Following tables show the Audit criteria & guidelines for both Auditors and Auditees vis-à-vis documents, material evidences, exhibits etc. to be verified during the audit process and prepared / maintained for audit process respectively. Tables 1, 2 and 3 shows the Audit criteria for curriculum design, teaching-learning and assessment & evaluation respectively.

S N	51. 10.	Criteria	Guidelines to the Auditor and Auditees
	1	The extent of curriculum compliance to the guidelines of concerned Regulatory Authority (eg. AICTE for technical programmes, BCI for law etc.)	Verify whether guidelines of the respective regulatory council followed and complied.

#### Table 1. Audit Criteria for Curriculum Design

	Effective participation / involvement of	Minutes of the meeting, mail communications.
2	external stakeholders in the curriculum	consolidated views of stakeholders etc. should
	design & revision	be verified.
	Satisfaction of curriculum for the	Mapping of program curriculum with Program
	requirements of Program Specific	Specific Criteria of appropriate professional
3	Criteria (PSC) of respective programme	society.
	prescribed by appropriate professional /	Mapping of program curriculum with faculty
	lead society	competency.
	Adequateness of the curriculum to	Mapping of program curriculum / courses /
4	address all the Program Outcomes of the	course outcomes with programme outcomes to
	respective program	be verified.
5	Frequency of curriculum revision /	Once in semester / year / two years / three
5	syllabi modification	years / four years.
6	Summary of feedback of course	Consolidated feedback summary of individual
6	handling faculty on course & syllabus	course handling faculty on course & syllabus
_	Recommendations of BoS incorporated	Minutes of BoS and revised curriculum and
1	in the curriculum & syllabi	syllabus.
	Pasammandations of Acadamia Council	Minutes of Academic Council and revised
8	incorporated in the curriculum $\&$ syllabi	curriculum and syllabus
	incorporated in the currentum & synabl	currentum and synabus.
9	Relevance of course outcomes with	Articulation of course outcomes with
2	respect to the content	taxonomy level and their appropriateness.

Table 2	Audit	Criteria	for <sup>r</sup>	Teaching	-Le	arning
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Sl. No.	Criteria	Guidelines to the Auditor and Auditees
1.	Conduct of Course Coordinator / Module Coordinator Meeting as per the schedule	Seven meetings must be conducted. Adherence to the meeting schedule. Discussion of Agenda tabled. Resolution made on each agenda tabled.
2.	Action taken / follow up of Course Coordinator / Module Coordinator Meeting	Implementation of actions arisen from the meeting resolution. Have observations made by the HoD & Dean concerned?
3.	Innovative Teaching – Learning / Active Learning Methods Attempted / Incorporated / Employed / Followed.	Instruction materials are prepared for delivery of syllabus content through contemporary teaching-learning methods.
4.	Students' attendance maintenance	Maintenance of the students' attendance and assessment record.
5.	Course file maintenance	Maintenance of course file as per the list. Relevance of the materials with content. Quality of the material & documentation.
6.	Feedback of the follow-up action on course faculty	Feedback collected from at least 80% of the students and analyzed, and corrective measures are taken.

7		Conduct of prescribed number of hours	Total hours to be conducted = $(L+T+P) * 15$ . For 1 credit (L = 15 / T = 30 / P = 30).	
/.	/.	as per the LTP	L-Lecture; T-Tutorial; P-Practical;	
			To be verified with logbook & course file.	
		It is expected to verify whether student records		
	8.	Student Mentoring	are updated regularly. Impact of mentoring	
			should be documented	
		Availability of the academic facilities &	Experimental set-up for all the experiments,	
	9.	Equipment / Software / Hardware to	working condition of equipment and	
		conduct experiments	availability of open source / licensed software.	

Sl. No.	Criteria	Guidelines to the Auditor and Auditees
1	Assessment conducted to all the COs	Assessments (tests, seminars, assignments etc.) must be conducted to measure the attainment of each course outcome.
2	Taxonomy level of questions and corresponding course outcomes	Taxonomy level of at least one Assessment task should be as same as the level of the corresponding course outcome.
3	Adequateness of time	A maximum of $\pm 5\%$ of total time error may be tolerated.
4	Language and Grammar	Question should be free from spelling mistake and grammar mistake.
5	Assignment tasks and Taxonomy level	Taxonomy level of at least one Assignment task should be as same as the level of the corresponding course outcome.
6	Availability of schemes for evaluation	Mark allocation scheme must be available for each assessment. Rubrics are expected wherever required.
7	Fairness in the evaluation	A maximum of $\pm 10\%$ mark variation in the evaluation may be tolerated.
8	Transparency in the evaluation	It is expected to distribute the valued answer scripts to the students and get signature of the students in the answer script.
9	Quality of the experiments in practical courses / project work	It is expected to verify record / observation
	a. Conduct of all the experiments	note book and haboratory manual.
	b. Regularity of observation and record work completion	Students completed one experiment in each lab session and got signature before the next lab class.
	c. Rubrics for practical courses	Verify the rubrics developed for practical course and followed for each experiment.
	d. Model Examinations	Verify some sample answer scripts.
	e. Project review	Two / Three reviews must be conducted.

#### Table 3. Audit Criteria for Assessment and Evaluation

f.	Rubrics for project work	Rubrics developed for various reviews informed to students well in advance and followed throughout the project work.
g.	Project report as per guidelines	Verify the sample project report.

#### 4. AUDIT REPORT

Following tables show the Audit report to be filled by the Auditor during audit process. Tables 4, 5 and 6 show the audit report form for curriculum design, teaching-learning and assessment & evaluation respectively.

Sl. No.	Criteria	Extent of Gaps	Description of Gaps or Scope for improvement	Strategies to bring improvement
1	The extent of curriculum compliance to the guidelines of concerned Regulatory Authority (eg. AICTE for technical programmes, BCI for law etc.)			
2	Effective participation / involvement of external stakeholders in the curriculum design & revision			
3	Satisfaction of curriculum for the requirements of Program Specific Criteria (PSC) of respective programme prescribed by appropriate professional / lead society			
4	Adequateness of the curriculum to address all the Program Outcomes of the respective program			
5	Frequency of curriculum revision / syllabi modification			
6	Summary of feedback of course handling faculty on course & syllabus			
7	Recommendations of BoS incorporated in the curriculum & syllabi			
8	Recommendations of Academic Council incorporated in the curriculum & syllabi			
9	Relevance of course outcomes with respect to the content			

	Table 5. Audit Report for Teaching – Learning				
Sl. No.	Criteria	Extent of Gaps	Description of Gaps or Scope for improvement	Strategies to bring improvement	
1	Conduct of Course Coordinator / Module				
1.	Coordinator Meeting as per the schedule				
2	Action taken / follow up of Course				
۷.	Coordinator / Module Coordinator Meeting				
	Innovative Teaching – Learning / Active				
3.	Learning Methods Attempted /				
	Incorporated / Employed / Followed.				
4.	Students' attendance maintenance				
5.	Course file maintenance				
6.	Feedback of the follow-up action on course faculty				
7.	Conduct of prescribed number of hours as per the LTP				
8.	Student Mentoring				
9.	Availability of the academic facilities & Equipment / Software / Hardware to conduct experiments				

#### Table 6. Audit Report for Assessment and Evaluation

SI. No.	Criteria	Extent of Gaps	Description of Gaps or Scope for improvement	Strategies to bring improvement
1	Assessment conducted to all the COs			
2	Taxonomy level of questions and corresponding course outcomes			
3	Adequateness of time			
4	Language and Grammar			
5	Assignment tasks and Taxonomy level			
6	Availability of schemes for evaluation			
7	Fairness in the evaluation			
8	Transparency in the evaluation			
9	Quality of the experiments in practical courses / Project work			
	a. Conduct of all the experiments			
	b. Regularity of observation and record work completion			
	c. Rubrics for practical courses			

	d.	Model Examinations		
	e.	Project review		
	f.	Rubrics for project work		
	g.	Project report as per guidelines		

#### **Extent of Gaps**

**D** - **Deficiency:** Not complied and must be addressed immediately; there is a huge gap between the expected and available.

**W** - Weakness: Poorly complied with high-probability for non-conformance; there is a moderate gap between the expected and available.

**C** - **Concern:** Complied at present but there is a probability for non-conformance in near future.

**S** - Strongly Complied.

#### 5. SUMMARY OF AUDIT REPORT

Name of the School	
Name of the Department	
Name of the Programme	
Name of the HoD	
Name of the Auditor-1 with affiliation (Internal / External)	
Name of the Auditor-2 with affiliation (Internal / External)	
Date(s) of Audit	



#### 2.13 Initiatives undertaken towards faculty development

Faculty / Staff Development Programmes	Number of faculty benefitted
Refresher courses	25
UGC – Faculty Improvement Programme	7
HRD programmes	120

Faculty / Staff Development Programmes	Number of faculty benefitted
Orientation programmes	250
Faculty exchange programme	105
Staff training conducted by the university	270
Staff training conducted by other institutions	182
Summer / Winter schools, Workshops, etc.	158
Others	-

2.14 Details of Administrative and Technical staff

Category	Number of Permanent Employees	Number of Vacant Positions	Number of permanent positions filled during the Year	Number of positions filled temporarily
Administrative Staff	65	-	13	-
Technical Staff	113	-	23	-

## Criterion – III 3. Research, Consultancy and Extension

3.1 Initiatives of the IQAC in Sensitizing/Promoting Research Climate in the institution

The University has constituted various committees as mentioned below for guidance for the New Project Proposals and to monitor the progress of funded projects and research scholars.

- ✓ Schools wise Research Advisory Committee, comprises of eminent savants from various distinguished Government and Private Research labs such as DRDO, DST, CSIR, CDAC etc., This committee's responsibility is to mentor the faculty members and students towards R&D activities. All the Funded Research projects of Faculty and Students are being mentored initially by the experts and submitted for the Review Committee's Scrutiny.
- R&D Review Committee for Individual Departments for assessing new Proposals from the Departments for the Guidance towards submission to funding agency and for the Seed Support. This committee is responsible for scrutinizing the project proposals before submitting it to the funding agencies.
- ✓ School Research Committee, headed by the Dean of the School with faculty members from each school as a member of the committee along with the Dean of Research Studies for monitoring the Progress of the Research Scholars. The Dean (Research Studies), School Dean, Supervisor, three internal faculty member and two external experts are part of this committee.
- ✓ All the activities acquainted to research (of faculty) are taken care and vigilantly monitored by the Director (Research & Development).

The university adopts proactive mechanisms as mentioned below to facilitate the smooth implementation of research schemes/projects.

- The University has well established Research Park comprising various Industries supported Labs & Centers.
- ✓ Separate Lab Space with all the decisive infrastructures and amenities are being afforded to all the sponsored Projects and dynamic Researchers.
- $\checkmark$  The University bequeaths the basic infrastructure for starting the research
- $\checkmark$  Provision for seed money for starting research before submission to the funding agency.
- ✓ The University supports with the funds for the sanctioned projects, even if any detain is there to receive fund from funding agency.
- ✓ The University endows complete support for the smooth running of the project, even if the subsequent release of the funds (2rd and 3rd installments) gets delayed.
- ✓ The Principal investigator has the autonomy for the utilization of the Funds received from Funding Agencies.
- ✓ The University also props in terms of additional funding for expanding the infrastructure that are obligatory for the project.
- ✓ Procurement of instruments and necessary consumables, as spotted in the project are given preferences and are facilitated by the purchase committee of the university.
- ✓ The Director (R&D) office helps the Principal Investigator for preparing the balance sheet and for auditing the finance statement by an external auditor. The office also makes the utilization certificate to be made available on time for submission to the funding authorities, normally made along with the project progress report.
- ✓ Various efficacious Research forums are launched under the mentorship of faculty and external experts for motivating the research mores among the Students.
The university adopts several steps as mentioned below to promote interdisciplinary research with members within and outside the University.

- ✓ The important initiative, the university has taken towards promoting the interdisciplinary research is establishment of Research Park comprising the Research facilities of all the streams of Engineering, Science and Management. This Centralized approach of the Research facilities creation enables the faculty members and students to interact with all the domain area experts.
- ✓ Availability of Research forums enables the faculty members and students to interact each other for joint developments.
- ✓ Motivation towards participation in various competitions organized by professional bodies (such as SAE, IEI, ICTACT etc.,) and other organizations (Power Grid Corporation of India, National Instruments etc.,) facilitates the interdisciplinary approach.
- Conferences Involving Different Departments / Schools of the University along with other National and International Organizations gives opportunity for the faculty members and students to interact with the other Departments.
- ✓ Inter and Intra Schools Project Competition and Exhibition are being organized regularly.
- ✓ The following research centers are established within the campus focusing on multi-disciplinary research
  - o E-Waste Management Facility
  - Centre for Autonomous System Research
  - Tinkering Lab (3D Printing Lab)
  - Centre of Virtual Instrumentation
  - Centre of Design, Engineering and Manufacturing

Faculty members are given leave for pursuing their full time education – either PhD of Post-Doctoral fellowship. On-Duty permissions are given to the faulty members for their part time education – Ph.D. The following is the sample list of faculty availed the opportunity.

The University has also taken award schemes as mentioned below to promote and encourage research activities.

- ✓ R&D Project Awards (For Every Funded Project, 5% of the Total Fund is being Paid as Incentive to the Faculty Members Involved in the Project. This is being paid immediately after receiving the fund. As on date more than Rs.15.55 Lac is paid under this category)
- ✓ Publication Cash Award (Every Publication in Scopus indexed Journal/ Conference received as Cash Award of Rs.10,000. This is being paid on regular basis – at least once in Two Months. As on date Rs.76.03 Lac is paid under this category)
- Dedicated Faculty Award (Research Contributions of the Faculty Members are considered for this award as separate category)
- ✓ **Incentive** (Monthly Incentives are being paid to the faculty for their Research Contributions)
- ✓ Students are also given due recognition for their achievements if they win prizes in oral/ poster presentation at conferences conducted elsewhere.

#### **Resource Mobilization for Research**

The Institution adopts following mechanisms for resource mobilization of research

- ✓ The Finance committee does Planning and Resources allocation to advise it on the allocation of Institution funds
- Research Project funds are monitored by the Director-R&D and are subject to audit at the end of the financial year
- $\checkmark$  A part of financial resource is from student fees and through trust fund
- ✓ Research grants required for activities are mobilized through sponsored projects by the faculty

Revised Guidelines of IQAC and submission of AQAR

- ✓ Consultancy projects also contribute as a financial resource.
- $\checkmark$  All the financial operations are transparently done through banking procedures.

# **Research facilities available**

# Centers of Excellence

- ✓ Automotive engine test facility in partnership with ARAI
- ✓ 3D Printing lab
- ✓ Virtual instrumentation lab in partnership with NI
- ✓ Center for Design, Engineering & Manufacturing in partnership with Dassault Systems (Germany)
- ✓ Center for E-waste management in partnership with DST
- ✓ High speed bearing test facility in partnership with DRDO
- ✓ Cyber security lab in partnership with IBM
- ✓ Telecom center for excellence
- ✓ R&D lab for innovative devices in partnership with Francecol (France)

# **Research Park**

- $\checkmark$  Center for industrial automation
- ✓ Aerospace propulsion center
- ✓ Composites research center
- ✓ Center for autonomous system research
- ✓ Center for computational fluid flow modelling
- ✓ Center for bio-waste management
- ✓ Materials and metallurgical engineering lab
- ✓ Materials science lab
- ✓ Organic chemistry lab
- ✓ Rocket motor testing lab
- ✓ Structural engineering research lab

# **Research Orientation**

- All the faculty and senior administrators have research bent and Institute is conducting various programs / reviews to enhance the research culture.
- Annual Self-appraisal of faculty also sufficiently insists on research.
- Overall Research Orientation is very good.

# Environment

- Full-time Ph.D scholars are given scholarships
- Faculty pursuing Ph.D are given financial assistance and special leaves
- Seed money is given for fresh researchers
- Incentive for research publications and projects

# Facilities

• A research park (88000 sqr. feet) housing state-of-the-art equipment/software and social spaces to conduct research in emerging areas.

# Output

- Good no. of sponsored projects from reputed funding agencies, joint projects with industries and internationally reputed Universities.
- Institute has very good h-index (83) and good no. of publications indexed in Scopus / SCI.

3.2 Details regarding major projects

	Completed	Ongoing	Sanctioned	Submitted
Number	8	13	3	31
Outlay in Rs. Lakhs	15930664	45414113	234080000	127166660

3.3 Details regarding minor projects

	Completed	Ongoing	Sanctioned	Submitted
Number	1	1	-	-
Outlay in Rs. Lakhs	50000	50000	-	-

3.4 Details on research publications

	International	National	Others
Peer Review Journals	884	111	-
Non-Peer Review Journals	-	-	-
e-Journals	-	-	-
Conference proceedings	176	-	-

3.5 Details on Impact factor of publications (2017-18):

Range	0.03-9.3	Average	4.65	h-index	15	Nos. in SCOPUS	995
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3.6 Research funds sanctioned and received from various funding agencies, industry and other organisations

Nature of the Project	Duration Year	Name of the funding Agency	Total grant Sanctioned in Lakh	Received in Lakh
Major projects	2017-18	SERB Equity, DST SERB	223.04	3.66
Minor Projects	2017-18	IEI	0.50	0.50
Interdisciplinary Projects	2017-18	MSME, DST,TBI	2335.30	1412.40
Industry sponsored	2017-18	<ul> <li>ARK infosolutins Pvt. Ltd.,</li> <li>Aeroship Creators,</li> <li>Bright World Innovation,</li> <li>Francecol Technology,</li> <li>M/s. Galvano Casting Pvt. Ltd,</li> <li>K.V. Engineers &amp; Contractors,</li> <li>M/s. Preethi Home Appliances,</li> <li>M/s. Wabco Foundation,</li> <li>M/s. Wipro 3D,</li> <li>M/S.High Tech Engineering,</li> </ul>	31.44	31.44

		<ul> <li>Metallic Bellows(India) Pvt Ltd,</li> <li>Stratasys, Ltd</li> </ul>		
Projects sponsored by the University/ College	-	-	-	-
Students research projects (other than compulsory by the University)	-	-	-	-
Any other(Specify)	-	-	-	-
Total			2590.28	1448
	•			

3.7 No. of books published	i) With ISBN	No	Chapters in	n Edited	Books 08	
	ii) Without I	SBN No	]		-	
3.8 No. of University Department	ments receiving	funds from				
	UGC-	SAP -	CAS -		DST-FIST	-
	DP	E -		DB	T Scheme/fur	nds -
3.9 For colleges						
	Auton	omy -	CPE -	DB	T Star Scheme	e -
	INSP	IRE 🖌	CE -	Any	Other (specify	y) -
3.10 Revenue generated t	hrough consul	tancy Rs.	31,44,478			
3.11 No. of conferences	Level	International	National	State	University	College
organized by the	Number	3	4	-	-	-
Institution	Sponsoring agencies	-	-	-	-	-
3.12 No. of faculty served a	s experts, chairj	persons or reso	urce persons	20		
3.13 No. of collaborations	Internati	onal 74	National	70	Any othe	r -
3.14 No. of linkages created	during this yea	<sup>ir</sup> 51				

# 3.15 Total budget for research for current year in lakhs:

			Testamo	a 4 . a a a 1	Applied	-		
			Intern	ational	Granted	-		
			Comm		Applied	-		
			Comn	Commercialised		-		
3.17 No. of year	research	awards/ recogn	itions receiv	ved by fac	ulty and rese	arch fello	ows of the institute in the	ne
	Total	International	National	State	University	Dist.	College	
	15	1	10	4	0	0	0	
3.18 No. of Ph.D. Gui and studer 3.19 No. of Institution 3.20 No. of 3.21 No. of	of faculty des nts registe of Ph.D. a Research JRl	from the Institutered under them warded by facuters received by $facuters$ for scholars received for a scholar structure scheduler for a scholar structure scheduler for a scholar scheduler schedu	ition who are lty from the ving the Fell 1 Pro n NSS event	e 9 42 1 owships ( ject Fellov s:	0 25 5 Newly enroll ws 8	led + exis Any ot	sting ones) her -	
				Univ	versity level	200	) State level	-
				Natio	onal level	-	International level	
3.22 No.	of studen	ts participated in	n NCC even	its: Univ	versity level	94	State level	50
				Nati	onal level	05	International level	-

From Management of University/ College

Applied

Granted

Applied

Number

13

-

-

62

1573.85

1511.85

Type of Patent

National

3.16 No. of patents received this year

From Funding agency

Total

3.23 No. of Awards won in NSS:



3.26 Major Activities during the year in the sphere of extension activities and Institutional Social Responsibility

Education is not just about learning how to be successful but also about learning how to be helpful, as Mahatma Gandhi rightly says "The best way to find yourself is to lose yourself in the service of others". To kindle the social consciousness and civic sense of today's youth means to create a better society in the future, as an effort towards this notion the Institution Deemed to be University actively organizes and conducts various NSS activities. The National Service Scheme aims at developing student's personality through community service. The orientation of NSS was conducted on 10. 02. 2015, the Chief Guests for the programme were Mr. S. Rajasekaran, State Liaison Officer – NSS, Mr. G. K. Dhas, Managing Trustee, Mother Teresa Charitable Trust, Chennai. Women's Day celebration was organized jointly by Community pro Club and NSS on 10.03.2015. Two E Waste collection rallies were organized by the E-Waste Cell and NSS and different venues in April 2015.

The events organized and participated in various social activities during last three years: two Blood Donation camps were arranged during this period in Apollo hospital and Kilpauk Medical Colleges. Swatch Bharath campaign was observed by pledge & Cleaning the Campus. Free Tailoring unit & Free Tuition centre in Kanniyamman Nagar were sponsored and Sewing Machine, Fans, Lights were given to the Trust. Flood Relief Service Sponsored Bedsheets & Towels at Mittanamilli High School, Mittanamilli and Eye Checking Awareness Program on Eye Screening & Blood Stem Cell Donation was done, Fire Demonstration on National Safety Day, White wash of Free Tailoring unit in Kanniyamman nagar by NSS, Blood Donation Camp and National Voluntary Blood Donation Day NSS.

The NSS joint parallel hands with the Institution clubs and organized several social events, a Written Exam for Scribes of National Institute of Visually Handicapped (NIVH) was arranged at Poonamalle, Institution

NSS & Community Pro Club participated in Swacch Bharath pledge & Cleaned the Campus, Blood Donation camps were arranged at regular intervals and blood was donated to Cancer Institute Adayar, MMM Hospital and Indian Red Cross Society. The NSS volunteers visited an Orphanage at Vellanoor

to celebrate Friendship day, Traffic Awareness Campaign was arranged at Ambattur Telephone Exchange, Awareness Program Anti-ragging, Bicycling & Treasure Hunt and Eye Donation Awareness Session. International Charity Day-Feed the Need Clothes Collecting were the other events of importance organized by the NSS. The Annual Special Camp of NSS was held wherein they Adopted Village.

The NSS activities of the current year are, Written Exam for Scribes National Institute of Visually Handicapped (NIVH), Anti-ragging Awareness Program, mega Clothes Collecting for International Charity Day-Feed the Need. Special Camp NSS was conducted between 07.09.2017- 13.09.2017 Pandeeswaram, Kadhavur & Arakkambakkam.

# **Criterion – IV**

# 4. Infrastructure and Learning Resources

4.1 Details of increase in infrastructure facilities:

Facilities	Existing	Newly created	Source of Fund	Total
Campus area	66.75 Acres	-		66.75 Acres
Class rooms	165	8		173
Laboratories	90	25		115
Seminar Halls	17	-		17
No. of important equipment purchased $(\geq 1-0 \text{ lakh})$ during the current year.	Computers, Lab Equipment, furniture & fixtures, student amenities	Computers, Lab Equipment, furniture & fixtures, student amenities	Institution Funds	-
Value of the equipment purchased during the year (Rs. in Lakhs)	2030.52 (Lakh)	190.99 (Lakh)		2221.4
Others				

4.2 Computerization of administration and library

- Implements the Institution Management System and ERP Modules in academic and administrative level.
- All the processes are made online from admissions to declaration of results.
- Provides different logins for Students, Parents and Faculty.
- The Library records are online and RFID supported.
- **OPAC:** The Online Public Access Catalogue (OPAC) has been facilitated to the students, faculty and library staff. The OPAC is accessible from the Library premises. The WebOPAC is also available on our University website
- Electronic Resource Management package for e-journals: The e-journals are accessed through the websites of the publisher individually. However, we are planning to have the e-resource management package for e-journals.
- Federated searching tools to search articles in multiple databases: The subscribed online journals and database are accessed by logging on to the websites.
- Library Website: The Library's presence on our University website http://www.veltech.edu.in/library/library\_home.htm is sufficiently covered as one of the main menus.
- **In-house/remote access to e-publications:** The e-resources like online journals and online database are accessed remotely by the faculty. The access to such e-resources, as well as (CD-DVDs), has been given to the students and faculty in the Library. Journals are subscribed under IP based Subscription. In-house journals and research publications are in central library.

# 4.3 Library services:

	Existing		Newl	ly added	Total		
	No.	Value	No.	Value	No.	Value	
Text Books	92110	31692533	2119	979583	94229	32672116	
Reference Books	3500	1333025	245	110250	3745	1443275	
e-Books	48679	177000	40000	147000	88679	324000	
Journals	1204	4011776	122	251935	1326	4263711	
e-Journals	48326	7860222	1737	1089502	50063	8949724	
Digital Database	4	6579612	-	1977361	4	8556973	
CD & Video	4200	-	90	-	4290	-	
Others (specify) RFID	1	898110	-	-	1	898110	
Kindle	20	234960	-	-	20	234960	
Library Software	1	55000	1	145000	2	200000	
Computers	99	2832500	-	-	99	2832500	

4.4 Technology up gradation (overall)

	Total Computers	Computer Labs	Internet	Browsing Centres	Computer Centres	Office	Depart -ments	Others
Existing	1580	1075	540 Mbps LL	Part of	148	140	219	5 laptops
Added	1345	1057	1400Mbps LL	Compute	-	19	270	17 Laptops
Total	2925	2132	1940 Mbps LL	r Labs	148	159	489	22 Laptops

4.5 Computer, Internet access, training to teachers and students and any other programme for technology upgradation (Networking, e-Governance etc.)

- Provided computers for access to quality study and reference material to the faculty.
- Extended the optical fiber backbone in all departments and administrative buildings.
- Upgraded its Firewall, core switches and internet bandwidth.
- Provided Wi-Fi hot-spots both inside the campus and in the Hostels.

4.6 Amount spent on maintenance in lakhs:

i) ICT	506.26
ii) Campus Infrastructure and facilities	4333.88
iii) Equipment	190.88
iv) Others	821.46
Total :	5852.48

# Criterion – V

# 5. Student Support and Progression

5.1 Contribution of IQAC in enhancing awareness about Student Support Services

The Institution deemed to be university has the following adequate support facilities for the students.

# • Physically challenged / differently-abled students

They receive concessions in various fields. Mentors take special care of the differently-abled by providing them the necessary counseling and guidance. There are other infrastructure facilities available for them as mentioned below.

- Lift: Lift is available for use of Senior Faculty Members and Physically Challenged persons.
- **Ramp:** All the buildings are provided with ramps for easy access by physically challenged persons
- Wheel Chair: University has sufficient number of wheel chairs which are available at main gate reception for transportation purpose.
- **Rest Rooms:** Separate Rest Rooms are available for the Physically Challenged persons
- Class rooms are allotted in Ground Floor with the consideration on the number of Physically Challenged students in the class.

# • SC/ST, OBC and economically weaker sections

SC/ST and OBC students are receiving grants from State governments on a monthly basis. The University supports the needy students for their books through the Book Banks run by NGOs / Trusts.

# • Students participating in various competitions/conferences in India and abroad

Students who participate in the various curricular and extra-curricular activities are given tremendous support by providing registration fee, travel allowance and On Duty attendance. Incentives for winning prizes and awards are being paid to motivate the winners. Faculty members accompany the students to the colleges to ensure the safety and security of the students and provide them the necessary emotional support.

# • Health centre, health insurance etc.

The Institution Deemed to be University has a medical centre located near the Institution campus. The service of a doctor and two nurses are available 24 hours in the centre. The Institution has three ambulances that transport the physically weak students from the Institution to the medical centre.

The Institution insured all the stake holders of the Institution through the Group Insurance Scheme.

# • Overseas students

Overseas students are given special accommodation in both ladies and gents hostel. They are also given modern amenities like air-conditioned rooms and Wi-Fi connectivity. Food Menus are made available with respect to the student's nativity.

# • Skill development (spoken English, computer literacy, etc.)

The English department conducts Communicative English classes and the students receive practical help from the English proficiency labs. Spoken English classes are conducted in the hostel for students from non-English medium background to enhance their communication skills. The Institution Deemed to be University signed Collaborative agreement with British Council for Improving the communication skills and certifications.

The Institution offers on campus value added courses in collaboration with Microsoft, RedHat etc., and skill development courses through the collaboration with NSDC, TSSC etc.,

### • Performance enhancement for slow learners

Counseling and guidance are given to motivate the slow learners. Remedial classes are conducted for slow learners after the college hours.

# • Exposure of students to other institutions of higher learning/ corporates/business houses, etc.

Students are encouraged to attend internship programmes to become accustomed to the functioning of other institutions, corporate and business houses. Lectures and Workshops are conducted by professionals from the corporate and business divisions to acquaint students to the various sectors in the field.

The University conducts coaching classes for students appearing for Civil Service and other competitive examinations such as GATE, GRE and TOEFL. Quite a few of our aspiring alumni cleared some of the service and competitive examinations and performing satisfactorily in their service.

The institution also conducts foreign languages, German and Mandrin, for the interested students.

### • International Exposure

- 1. **Through the International Researchers:** Eminent Researchers from reputed educational institutions &Organisations across the globe are regularly invited for Special Lectures/ Special Courses, seminars, workshops and conferences.
- 2. **International Internships:** Students are regularly deputed for taking up Internship at Reputed R&D Organisations across the Globe
- 3. **Bonvoyage/ Alumni Interaction:** Bon Voyage functions are arranged for the Alumni travelling abroad for higher studies are awarded with cash awards and an Interactive Session is arranged with the Students with the details of the Process and Guidance. Interaction alumni through Video Conferencing are organized.
- 4. **International Cell:** This cell is addressing the issues related to the International activities and opportunities available at the Institutions Abroad.

# • National Exposure

- 1. **Through the Industry Experts & Researchers from National R&D Organisations:** Industry Experts and Eminent Researchers from reputed R&D Organisations are regularly invited for Special Lectures / Special Courses
- 2. Internships at R&D Labs and Industry: Students are regularly deputed for taking up Internship at Reputed National R&D Organisations
- 3. Alumni Interaction: Regular Alumni Interactions are arranged with the students

# • Publication of student magazines

All departments are publishing News Letter with information on the Students Activities, Recent Developments etc., and uploaded in the Institution website.

The Institution has the Post Office and Vijaya Bank inside the campus for the benefit of students.

In all the hostels and Institution campus the ATM Machines are available.

The Institution Deemed to be University provides assistance to students for obtaining educational loans from banks and other financial institutions.

- The Institution Deemed to be University invites many nationalized banks during the Admissions/ Single Window Counseling Processes for Guidance/ Application Process/ Sanction of Loans.
- The Institution Deemed to be University is having special arrangement with Vijaya Bank with a branch within the campus such a way that the students can avail the loan facility at their own home town.
- For continuation of the loan, the Institution Deemed to be University officials makes sure that the letters containing the fee details of the Tuition/ Hostel/ Transport Fee are being sent directly to the banks on receipt of the request from student.
- In case the students' fees are paid through the bank loan, the Institution Deemed to be University provides additional time line for the payment of the fee.
- In addition to the Bank Loans and the Institution Deemed to be University provides Mahatma Gandhi National Merit Scholarship (INR 7 Crores per Annum) to the meritorious students.

The Institution Deemed to be University also facilitates the students in getting scholarship from other agencies/ trust/ NGOs. The details are given below.

Sahu Jain Trust Scholarship	FAEA Scholarship
Sophi Merit Scholarship	Sitaram Jindal Foundation
Indian Oil Scholarship	Fair & Lovely Scholarship
ONGC Scholarship	UGC Scholarship
Minority Welfare Scholarship (All State)	K.C.Mahindra Education Trust
North South Foundation	NTPC Scholarship
Asha Endowment Scholarship	IET Scholarship
HDFC Scholarship (ECSS)	S.N.BOSE Scholar
Program Brother Scholarship	AICHI Scholarship
CMC LIMITED	Vijayalakshmi Trust
Global Graduate Engineer Scholarship at NIT JAPAN	OBC/SC/ST Government Scholarship
University Of Malaya Scholarship	Central sector scheme of scholarship (CSS)
LIC Scholarship	

The Institution Deemed to be University provides 50% concession in Tuition Fees for the students who had lost their father during the students' studies.

# Veltech Mahatma Gandhi National Merit Scholarships

Realising that even after 69 years of independence, higher education was not accessible to the deserving poor, Industrialist-turned Philanthropist, Educationist couple Prof. Dr. R. Rangarajan and Dr. Mrs. Sagunthala Rangarajan, introduced VELTECH MAHATMA GANDHI NATIONAL MERIT SCHOLARSHIP SCHEME in 2009 with the twin objectives of national integration and barrier-free access to affordable higher education, Since its first award in 2009, the University has bestowed 2420 scholarships worth approximately 12.87 cores.

### The Scholarships offered are based on PCM/BPC aggregate scored by the Student

- A student who scores **above 95%** will be eligible for **75%** Scholarship in the Tuition Fee.
- A student who scores between 90 94.9% will be eligible for 50% Scholarship in the Tuition Fee.
- A student who scores between 80 89.9% will be eligible for 25% Scholarship in the Tuition Fee.
- A student who scores between 70 79.9% will be eligible for 10% Scholarship in the Tuition Fee.

Top rank holders in PCM/ BPC from each State are acknowledged and awarded with 100% scholarship in their tuition fee.

Scholarship for Vel Tech Engineering Entrance Examination 2018 – VTUEEE 2018 Scholarships will be offered based on the Rank Scored by the student in VTUEEE exam. Top 20 Rank holders will get 75% scholarship in Tuition Fee, Students who score between Rank 21 to 500 will be eligible for 50% scholarship in Tuition Fee.

The university has established cells such as Placement Cell, Anti Ragging Cell, Gender Sensitization Cell, Anti-Discrimination Cell, etc.

### 1. Placement Cell

The placement cell committee has been constituted with list of faculty members to look after the training and placement. The membership of the nominated members shall be for a period of two years. The members will meet in regular intervals to discuss and plan for placement and training related activities.

#### 2. Anti-Ragging Central Committee

The Anti Ragging Squad will be responsible for Anti Ragging measures in the university campus, student Hostels, play grounds, dining areas and any other critical areas. They will form duty chart & carryout regular checks for any Ragging activity in their areas. They will carry out surprise checks in probable areas of ragging. In case of any incidence noticed on the spot, assessment of the incidence is made and necessary action to be taken and inform the central committee immediately. Ensure anti ragging instructions are displayed at prominent places in their areas of control. Each squad member will make detailed duty plan in respect of his/ her area and forward the same to the central committee.

#### 3. SPARSH Committee

(Sensitization, Prevention and Redressal of Sexual Harassment)

The Institution Deemed to be University is committed to create a work environment that is resourceful, industrious and fulfilling. This includes ensuring that each student, faculty and non-teaching staff works together in an environment free from gender-bias, harassment, all forms of violence, exploitation, discrimination and intimidation. With this in mind, the Institution Deemed to be University has formed a committee to ensure a healthy and friendly working atmosphere. The Sensitization, Prevention and Redressal of Sexual Harassment (SPARSH) committee strongly supports gender equality and opposes any form of gender discrimination and violence. The SPARSH committee composes of lady faculty only.

Sl.No	Category	Number
1	Chairperson	1
2	Head of the Department	2
3	Student Counsellor	1

#### **Composition of SPARSH Committee**

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4	Teaching Staff	2	
5	Non-Teaching Staff	1	
6	Student Representatives	2	

**Functions:** 

- In the meeting, discussion is carried out regarding the issues related to gender discrimination and immediate remedial action is taken.
- Boards with names and contact numbers of SPARSH committee members are displayed in various parts of the Institution.
- The committee has a mail ID which is displayed in the SPARSH committee members name board and the mail is checked periodically.

### Frequency:

• The committee meets once in a month.

# 5.2 Efforts made by the institution for tracking the progression

The Institution Deemed to be University has a system for student mentoring and support. The Structural and functional characteristics of the Mentoring process are as follows:

# **Structural characteristics**

- Each teaching staff is a mentor and 20-25 students are allotted to each mentor.
- The mentoring hour is conducted once in a week, where the mentors approach the mentees and enquire about their academic and personal problems.
- The department mentor coordinators supervise the mentoring activities in their respective departments and the mentors report to the mentor coordinators.

# Functional characteristics

- An effective mentoring system is implemented to provide guidance and counselling to the students.
- Each student in the university has a mentor and each mentor has 20-25 students under them.
- A separate Student Record is maintained for each student, recording his progress of all four years, including his placement details and offered Continuous Professional Assistance thereafter.
- The mentor periodically conducts meeting with his mentees and maintains complete details of the student's activities like, academic progress, curricular, co-curricular, extracurricular, achievements, social activities, personal and disciplinary issues and details of parent's meetings in his respective student's record.
- The parents are informed of their ward's academic progress over phone or by email or by post. In circumstances of a student failing in more than one subject, in unit or midterm tests or the Institution Deemed to be University examinations, his parents are informed immediately and requested to appear in person for further counselling of his wards.
- Any discrepancies noticed in the student's behaviour in the matters of discipline, attendance is monitored and counselled with care. Students who require advance counselling and medical attention are referred to the Institution Deemed to be university student's counsellor and to the medical team.
- Provides guidance for selection of specialization, mini and major projects, internship, industrial visits and research activities.
- Provides job placement counselling and directs the students to undergo Add -On courses on both technical and non-technical.
- Advises the students to opt programme electives, allied electives, open electives and value education electives which are more course/lab specific.

- Educates on the Institution Deemed to be University's policies and regulations and anti-Ragging measures and informs the consequences of involving in ragging or anti-social activities.
- Thus, the mentoring system takes care of the complete overall development of the students during their tenure in the Institution Deemed to be university and thereafter.



5.4 Details of student support mechanism for coaching for competitive examinations (If any)

The University conducts coaching classes for students appearing for Civil Service and other competitive examinations such as GATE, GRE and TOEFL. Quite a few of our aspiring alumni cleared some of the service and competitive examinations and performing satisfactorily in their service.

5.5 No. of students qualified in these examinations



5.6 Details of student counselling and career guidance

SL NO	DATE	TITLE	NAME OF EXPERT	NAME OF THE ORGANIZATION	NUMBER OF STUDENTS	ACADEMIC BATCH
1	17-06-2017	EMPLOYABILITY SKILLS	Mr.Manikanta Namburi	Thought Works	194	2014-2018
2	22-9-2017	SOFT SKILLS	Ms.Suma Koralgundi	Life Coach	100	2014-2018
3	18-8-2017	SOFT SKILLS	Ms.Arpita Karmakar	University Relations at USEReady	116	2014-2018
4	25-7-2017	COMMUNICATION SKILLS	Mr.Yuvaraj	Mu Sigma	111	2014-2018
5	14-12-2017	Interactive Session for MBA students	Mr. Suresh Reddy	Lycos Internet ltd	61	2016-2018
6	08-01-2018	Machine learning and artificial Intelligence	Mr. Balaji Natarajan	Capgemini	126	2015-2019
7	25-01-2018	Swimming with the sharks Embracing corporate culture	Mr.K.S Mukund	Emerging Market	286	2015-2019
8	21-02-2018	Can you Help in cyber revolution	Mr. Karthik Kittu	Passion Connect	135	2016-2020
9	28-02-2018	Cloud Computing	Mr. K.S.S Krishnan	Capgemini	138	2015-2019
10	21-03-2018	Dynamic talent cloud	Mr. Sagar Gondkar	DXC Technology	134	2015-2019
11	16-04-2018	Trends and challenges in IT Industries	Mr. T.V Devi Prasad	IIIT – Hyderabad	124	2015-2019

5.7 Details of campus placement

On campus			Off Campus
Number of Organizations Visited	Number of Students Participated	Number of Students Placed	Number of Students Placed
63	1025	550	78

5.8 Details of gender sensitization programmes

# Event 1:

On March 8, 2018 Department of CSE initiated the first day celebration of Women's day with self-defense program and Tamil Pattimandram on women empowerment. Mrs.Vijayalakshmi Devarajan, HR & Operation Women Achiever-Women empowerment, Ministry of women and child development, accepted our cardial invitation and joined with us to celebrate the women's day function.

A self-defense program started at 9 am by the resource person Mr. A. Ramesh Kumar, Intelligent Officer, Intelligence Section (IS), Chennai Police. With the support of Avadi police personals he started the practice

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session and the event lasts for two hours. Our girl students were voluntarily participated with complete interest for learning self- defense actions. Some interested faculty members also actively involved in that session.

We honored the resource person and police personnel with momentum and it was delivered by the esteemed chief guest Mrs.Vijayakahmi Devarajan.

At 11.00 pm, we have started the pattimandram on women empowerment program with the selected faculty members from various department. The pattimandram was organized with four participants in each team headed by a judge Dr.Velu Ramasamy, Professor of Mechanical Engineering, Veltech. The extravagancy performance was given by the participants of pattimandram and the chief guest relished the notorious moments.

Dr. Velu Ramasamy, also added some giggleness over the participant's talk which entertained the audience well. At the end, he concluded the debate by his golden words in favor of women. Then the chief guest Mrs.Vijayakahmi Devarajan started addressing the audience about the empowerment of women and the duties that every women must do for the betterment of society. She gave some brief introductory about the social service which she organized.

Finally, the event concluded with rewards and awards for the participants and the memento is delivered to the chief guest by 12: 30 pm.



On March 10<sup>th</sup>,2018 CSE Department organized the second day of women's day celebrations with the legendary speaker Mr. H. R. Mohan, Past Vice Chair Person IEEE Madras Section, Mrs. Umasree **Raghunath**, Program Manager, IBM Chennai & Treasurer ewit, **Mrs. Latha Ramesh**, Consultant, past chair & patron CSI Chennai, Life member and Advisor ewit.

Dean SoC, Inaugurated the second day by saying the importance of women and delivered some motivational words to the girls and faculty members. Then H.R Mohan gave some brief introductory about the opportunities existing in IEEE for women participants to guide especially the girl students and faculty members.

Mrs. Umasree Raghunath spoke about the 'opportunities and challenges for women in IT and Engineering'. Her talk attracted the girl students and the people interacted with her about the opportunities and the knowledge they have to acquire to get into the IT field. She gave some extraordinary ideas to girls for making their career well success.

Mrs. Latha Ramesh delivered the talk on 'Return to employment after break', Discussed the importance of career especially to girls also shared some personal experiences that encouraged her to persist in career. Her golden words encouraged the girl students and faculty members especially, to get into their career even after break. Finally, the chief guests were honored by our Head of the Department, Dr. N. Malarvizhi and Dean School of Computing Dr. M. M. Naidu.



5.9 Students Activities



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# 5.10 Scholarships and Financial Support

	Number of students	Name of the Scholarship	Amount
Financial support from institution	8451	Vel Tech Mahatma Gandhi National Merit Scholarships	Rs.24,52,33,961
Financial support from government	54		Rs. 14,85,000
Financial support from other sources	-	-	-
Number of students who received International/ National recognitions	-	-	-

5.11 Student organised / initiatives



5.13 Major grievances of students (if any) redressed:

- Student dress code relaxed
- Ten minutes time additionally increased during lunch
- More shops opened in canteen
- Fee payment through online portal
- Academic flexibility Same course offered in more number of slots

# Criterion – VI

# 6. Governance, Leadership and Management

6.1 State the Vision and Mission of the institution

# Vision

To create, translate and share frontiers of knowledge embedded with wisdom and innovation for a positive transformation of emerging society.

# Mission

To nurture excellence in teaching, learning, creativity and research; translate knowledge into practice; foster multidisciplinary research across science, medicine, engineering, technology and humanities; incubate entrepreneurship; instill integrity and honor; inculcate scholarly leadership towards global competence and growth beyond self in a serene, inclusive and free academic environment.

6.2 Does the Institution has a management Information System

# YES

6.3 Quality improvement strategies adopted by the institution for each of the following:

6.3.1 Curriculum Development

- The curriculum is designed referring the Professional bodies of the programmes concerned curriculum standards.
- The Departmental committee is formed within the department consisting of the Dean, Head of the Department and Internal Board of Studies members.
- The curriculum sketch is framed by getting the inputs from
  - SWOC analysis.
  - o Feedback from faculty, Alumni, Industry, Academic and
  - Benchmarking from other reputed institutions
- It is then forwarded to Departmental committee for discussion
- After discussion the curriculum and syllabus are forwarded to the BOS approval.
- If not satisfied the suggestions are considered to revise the curriculum and syllabus.
- Courses are mapped with twelve Programme Outcomes (PO) and Program Specific Outcomes (PSO).
- After the curriculum Sketch is designed the syllabus content is framed for each course.
- The Course Outcomes for each course are framed.
- The mapping of the CO with PO and PSO are done.
- The Desired Program Outcome (PO) is the target value.
- For each PO and PSO the measured values are computed.
- The difference between the DPO and MPO are done to add the required number of Cos or to increase the knowledge level.

#### 6.3.2 Teaching and Learning

The philosophical changes happened recent years in the accreditation criteria / process of National Board of Accreditation (NBA) necessitates the implementation of Outcome Based Education (OBE) in the university's academic system. Almost all the faculty members of the university underwent OBE training through series of workshops in various spells conducted by the Centre of Educational Innovation and as a result couple of engineering programs were accredited by NBA. Program evaluation (CDIO standard 12), which is a part of faculty appraisal system, conducted previous two years has revealed the deficiencies in the faculty related CDIO standards 8, 9, 10 and 11. Having realized the lack of faculty teaching competence the university started a faculty peer learning community so-called Teaching Developers Initiative (TDI) which is a congregation of fifteen passionate faculty members to enhance the faculty teaching competency (Standard 10). The TDI has been modeled to create an encompassing movement towards enhancing the teaching skills of faculty members through peer learning to fit themselves for Y-Gen students of 21<sup>st</sup> Century. Every Friday evening, all the members of TDI meet and discuss among themselves about diffracting teaching methods to share their experiences and to hear the perspectives of those from other disciplines.

On 4<sup>th</sup> November 2016, The TDI Day was inaugurated by Dr. E. Balagurusamy, a renowned academician, a policy maker and a technocrat who has contributed to the proliferation and quality of technical education in India. In his inaugural address, Dr. E. Balagurusamy said, "Role of present day teacher is not as it was a decade ago. Mere lecturing alone will not be sufficient to make the students to think and learn. Efforts such as Teaching Developers Initiative are the need of the day for every higher education institution to enhance the teaching skills of faculty members. Vel Tech University should share its experiences of the Teaching Developers Initiative with other colleges and universities in the industry."

The inauguration began with a video documentary to introduce the TDI initiative to the august audience. TDI 2016 features an exhibition of learner-centric pedagogy used by the members of the TDI in the classroom. This showcase is an avenue for to inspire fellow teachers. This TDI DAY paves a wonderful platform for the university teachers to share their semester-long classroom innovative teaching experiences and TDI Friday meeting joys with their peers in the university to motivate them to join this initiative. TDI which started with a small team of 15, one or two from each department, is expected to expand to 45 next semester and to bring a change in the teaching learning culture in the university.

# 6.3.3 Examination and Evaluation

# 1. Description

1.1 Continuous Evaluation (CE) shall be conducted by the course handling faculty/course coordinator all through the semester; it includes unit tests, midterm tests, assignments, projects and other means covering the entire syllabus/all the course outcomes.

1.2 Semester End Examination (SE) shall be conducted by the Controller of Examinations at the end of a semester, as per the academic calendar and it includes a written examination for theory courses, and practical examination and viva voce for laboratory/project courses.

1.3 Scheme of Continuous Evaluation

- (i) For all the theory courses, the continuous evaluation shall be for a maximum of 40 marks consisting of two unit tests, two mid-term tests, two assignments and regularity of students. The tests shall be conducted on the dates mentioned in the academic calendar and assignment submission dates shall be given by the course faculty.
- (ii) There shall be two unit tests each carrying 10 marks. Two-third of the best unit test mark and one-third of the other unit test mark shall be considered for continuous evaluation. The test shall consist of two questions each carrying five marks. There shall be two mid-term

tests each carrying 20 marks. Two-third of the best mid-term test mark and one-third of the other mid-term test mark shall be considered for continuous evaluation.

- (iii) There shall be two assignments each carrying five marks. Two-third of the best assignment mark and one-third of the other assignment mark shall be considered for continuous evaluation.
- (iv) Attendance marks for each theory course shall be awarded as below

Attendance marks for	theory courses
Attendance (%)	Marks
90% and above	5
80 to 89%	4
75 to 79%	3
Below 75%	No mark

(v) For all the laboratory courses, the continuous evaluation shall be for a maximum of 40 marks consisting of student's performance in each laboratory session and model test.

# 2. Scheme of Semester End Examination

(i) For all the theory, practical, and project courses, the semester end examination shall be for a maximum of 60 marks as mentioned in the academic calendar.

- (ii) The examination shall consist of three parts Part A, B and C.
  - Part A shall cover remember and understand level questions and carry 10 marks.
  - Part B shall cover only understand level questions and consist of five questions of either or type, one from each unit, and carry 20 marks.
  - Part C shall cover understand and above levels questions and consist of five questions of either or type, one from each unit, and carry 30 marks.
  - The questions in Part A, Part B and Part C shall evenly address all the course outcomes.
- (iii) For seminar, internship/industrial training and industry offered courses, the semester end examination shall be for a maximum of 100 marks.
- (iv) The semester end examination for Project / laboratory courses shall be conducted for maximum of 60 marks on appropriate dates as mentioned in the academic calendar.
- (vi) For the integrated courses which have more than 50% credit contribution from lecture classes, the semester end examination shall be conducted for a maximum of 60 marks as same as for theory courses.
- (vii) For the integrated courses which have more than 50% credit contribution from practical classes, the semester end examination shall be conducted for a maximum of 60 marks on appropriate dates as mentioned in the academic calendar.

# 3. Conditions for Pass

- (i) A candidate shall be declared to have passed in individual theory/drawing course if he/she secures a minimum of 50% aggregate marks (continuous evaluation and semester end examination marks put together), subject to a minimum of 45% marks in the semester end examination.
- (ii) A candidate shall be declared to have passed in individual lab/project course, if he/she secures a minimum of 50% aggregate marks (continuous evaluation and semester end examination marks put together), subject to a minimum of 50% marks in the semester end examination.
- (iii) If a candidate fails to secure a pass in foundation courses and /or programme core courses, it is mandatory that he/she shall register and reappear for the examination in those courses during subsequent supplementary examinations and/or examinations conducted at the end of subsequent semesters.

# 4. Supplementary Examination

After the publication of the results of every semester examinations, a supplementary examination shall be conducted for the benefit of students who have failed in the current semester courses.

### 5. Revaluation

A candidate shall apply for revaluation of his/her semester end examination answer paper in a theory course, within the stipulated time from the declaration of results, on payment of prescribed fee along with prescribed application to the CoE.

### 6. Challenge Evaluation

The Challenge Evaluation is conducted as per the following Rules and Regulations, for the benefit of students seeking revaluation again in any one of the course papers of Examination(s), taken by them.

A Student who is confident of seeking Challenge valuation shall apply for Photocopy of the answer script(s) on payment of fee prescribed in the first instance

1. The candidate has to submit the requisition letter endorsed by the Head of the Department concerned along with the proof of payment of fee to the Controller of Examinations immediately after the publication of Revaluation Results.

2. The script will be evaluated by two subject experts of which one is as per the choice of candidates appointed by the Institution in the presence of the Controller of Examination

3. In case if the difference of Marks secured by the student exceeds 09, the amount of fee paid by him/ her will be refunded to him/ her provided that the student should get a minimum mark for a pass in that particular subject.

4. In case if the difference of Marks secured by the student is within the limit of 09, the amount of fee remitted by him/ her will not be refunded

5. The final marks awarded in the Challenge Valuation is final.

There is no revaluation / Challenge Evaluation for the supplementary examinations

# 7. Special Examination

There is a Special Examination for passed out students of B.Tech Degree Programme. A candidate admitted to the U.G Degree programme shall be permitted to take the special Examination in any one of the theory / practical arrear paper to enable him / her to qualify for the Degree and to avail the opportunity of job offer provided to him by the employer.

# **Eligibility norms:**

1. The student having only one arrear after having passed all the other course papers of that particular degree programme is eligible for Special Examination

2. The Student has to produce the appointment order or job offer letter as an evidence at the time of submission of examination application

- 3. The Date of Examinations will be fixed according to the choice of students
- 4. The results will be announced as per the Institution Procedure
- 5. There will be no Revaluation or Challenge Evaluation subsequent to the special examination

#### 6.3.4 Research and Development

- ✓ The University has well established Research Park comprising various Industries supported Labs & Centers.
- ✓ Separate Lab Space with all the decisive infrastructures and amenities are being afforded to all the sponsored Projects and dynamic Researchers.
- $\checkmark$  The University bequeaths the basic infrastructure for starting the research

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- $\checkmark$  Provision for seed money for starting research before submission to the funding agency.
- ✓ The University supports with the funds for the sanctioned projects, even if any detain is there to receive fund from funding agency.
- ✓ The University endows complete support for the smooth running of the project, even if the subsequent release of the funds (2rd and 3rd installments) gets delayed.
- ✓ The Principal investigator has the autonomy for the utilization of the Funds received from Funding Agencies.
- ✓ The University also props in terms of additional funding for expanding the infrastructure that are obligatory for the project.
- ✓ Procurement of instruments and necessary consumables, as spotted in the project are given preferences and are facilitated by the purchase committee of the university.
- The Director (R&D) office helps the Principal Investigator for preparing the balance sheet and for auditing the finance statement by an external auditor. The office also makes the utilization certificate to be made available on time for submission to the funding authorities, normally made along with the project progress report.
- ✓ Various efficacious Research forums are launched under the mentorship of faculty and external experts for motivating the research mores among the Students.

6.3.5 Library, ICT and physical infrastructure / instrumentation

Digital Library, OCR Technology and Services, Reprography Services

6.3.6 Human Resource Management

- The Human Resource Management policies of the institution are in compliance with UGC regulations and State Government guidelines.
- The appointment and promotions are made in transparent manner and as per defined and notified criterion.
- The organizational hierarchy of the University is well defined in which the job profile and job description in each and every office is clear to all stakeholders.
- The faculty is provided with opportunities to organize and attend seminars and conferences at national and international level.
- Grant is provided to fund the travel partially.
- Faculty Development Programmes are organized to equip the teachers with latest academic and research tools.

# 6.3.7 Faculty and Staff recruitment

Faculty recruitment committee is constituted as per the guidelines of UGC. The committee consists of three subject experts for the post of Professor and Associate Professor, two experts for the post of Assistant Professor in addition to the Chancellor nominee, Director Academics, the Dean Faculty and Head of the department concerned. The Vice Chancellor is the Chairman and Registrar is the secretary for the interview boards. The minimum qualifications and experiences are followed as per the guideline of the concerned regulatory body.

The Staff (Non-Teaching both technical and non-technical) selection committee is composed of Vice Chancellor as Chairman and Registrar, the concerned head of department or section head or the research centre in charge as members. The minimum qualification/ experience is as per the nature of work following the norms of state government/ concerned regulatory body.

#### 6.3.8 Industry Interaction / Collaboration

- Industry Relations division inked MoUs with more than 500 industries, research organisation/laboratories/associations including those in abroad and healthy interactions with above 2000 industries.
  - o 100% of the students undergo In-Plant Training,
  - o 80% of UG Students doing their Project work/ Internships at Industries,
  - about 470 (150 minima per year) expect lectures as a part of the credit course were delivered by industry persons
  - o 10 PG Programme & 1 UG programme in Collaboration with Industries,
  - o 5 Centre of Excellence with the Support of Industries/ Research Institute,
  - Joint Research & Consultancy projects with Industries in India & Foreign Country (Korea, France, Canada etc),
  - Developing Ebike with Novelty in Motor technology in Collaboration with the Industry from France ensure the strong Industry-Academia relationship of the institution Deemed to be University.

6.3.9 Admission of Students

- Admissions of students are done once in a year on the basis of All India Common Engineering Entrance Examination conducted by the Institution Deemed to be University.
- The Entrance test is conducted both by Paper & Pencil Test (PPT) & Computer Based Test (CBT).
- Reservation Policy for SC/ST/OBC and Physically Challenged candidates will be applicable as per the rules of Government of India for the time being.

6.4 Welfare schemes for	No

Teaching	$\checkmark$
Non-teaching	$\checkmark$
Students	$\checkmark$

Each faculty is provided with faculty cabin/ room (Table/ chair/ Rack/ Cupboards, etc.,) depending on the designation. They are further provided either laptop/ computer exclusively or shared basis to carry out their academic duties. Apart from the above facilities the following welfare schemes are available: -

- Employment Provident Fund & Gratuity
- Staff quarters facility
- Interest free Loan facility from staff welfare fund
- Accidental Policy with United India Assurance for Employees
- Basic Pay scales based on 6th Pay Commission recommendations
- Annual Ph.D. Allowance for faculty
- One-month Salary as special Pay to Staff Members for Continuous Service
- Sabbatical Leave to pursue Higher Education / Research
- Higher increments for those who perform well
- Laptops are issued to Faculty members while at service to pursue Research and Development work
- Mother Fund scheme to all faculty
- Faculty members are encouraged to take up consultancy, projects and research work with special incentive
- Faculty members are sponsored to present papers in conferences abroad periodically.

- Maternity leave
- Scholarship for staff Children
- 70% of the faculty and staff benefited out of various employee welfare schemes

6.5 Total corpus fund generated Rs. 73,24,44,826
6.6 Whether annual financial audit has been done Yes ✓ NO
6.7 Whether Academic and Administrative Audit (AAA) has been done?

Audit Type	External			Internal
	Yes/ No	Agency	Yes/ No	Authority
Academic	Yes	AISHE	Yes	Academic Auditor
Administrative	Yes	-	Yes	Administrator Auditor

6.8 Does the University/ Autonomous College declare results within 30 days?

For UG Programmes	Yes	✓	NO	
For PG Programmes	Yes	✓	NO	

6.9 What efforts are made by the University/ Autonomous College for Examination Reforms?

The institution uses Automatic Scanning and Dummy Numbering Machine for all the examinations, which has made the evaluation process simple, efficient and less time consuming.
 We are also in the process of introducing question wise entry of marks in the answer booklet in OMR format, so that the course outcome level and the knowledge reach of the students can be easily obtained and analyzed.

6.10 What efforts are made by the University to promote autonomy in the affiliated/constituent colleges?

Not	Appl	licable
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6.11 Activities and support from the Alumni Association

- 1) ANNUAL ALUMNI MEET: Annual alumni meeting was conducted on Jan 26th of every year-26<sup>th</sup> JAN 2018.
- 2) **REGIONAL CHAPTERS:** The local chapters are conducted and pivotal role in networking of the alumni within a region nationally and International.
  - ▶ International Alumni meet SINGAPORE CHAPTER 3.6.2018
  - ➤ International Alumni meet USA New Jersey Chapter 26.05.2018
  - ➤ National Alumni meet Bangalore chapter 19.04.2018
  - ▶ National Alumni meet Hyderabad Chapter 27.05.2017
  - ➤ National Alumni meet Delhi Chapter 19<sup>th</sup> AUG 2017

▶ National Alumni meet - Pune Chapter – 26<sup>th</sup> AUG 2017

- 3) BATCHWISE REUNION Batch wise reunion uniquely conducted for one year batches.
  - Decennial Celebration (2007 Batch) 22<sup>nd</sup> APRIL 2017
- 4) ALMACONNECT: https://veltechuniv.almaconnect.com/contributions/sneak\_peek

Alma Connect which is powerful tracking & invitation mechanism to find and get alumni, students & faculty members join the network and always find their information updated on the platform through our website

- 5) ALUMNI MEMBERSHIP CARD: Life time Alumni membership card is being issued to all graduand of the year with great privileges and preference to access at Vel Tech University.
- 6) OPPURTUNITY TO ACCESS PROFESSIONAL DEVELOPMENT: Whats app group created for each year alumni helps senior alumni community who is successful in their field to help university graduates, but also with the younger alumni of the university to access opportunities in improving their careers and professionalism.
- 7) GOVERNANCE FRAME WORK: Alumni are greatly involved in a different frame work for the University governance
  - Board of Management
  - ➤ Academic council
  - Board of studies
  - > IQAC meetings
- 8) ALUMNI STUDENT MENTORSHIP: The Vel Tech Alumni Mentor Program enables alumni to share their professional and personal experience and expertise with current Vel Tech students. The connections made with the program help prepare our students for a successful future and leave a lasting impact on our campus community.
- **9) ALUMNI FEEDBACK FORM:** The development of any organization, especially at University, depends upon a well-functioning feedback system. Alumni feedback being collected from Alumni, who is one among the stake holder of the Institution.
- **10) ALUMNI STUDENT INTERACTION:** Alumni residing abroad interact with their juniors through Skype and few alumni visit the campus and we have interactive session to increase student knowledge with respect to Industry standards and expectation
- **11) ALUMNI SCHOLARSHIP:** Vel Tech alumni support a wide variety of scholarship recipients each academic year in order to motivate their juniors.
- **12) ALUMNI NETWORKING**: Institution united option of the alumni online and kick off meeting as well popularized through
  - ➢ Facebook
  - > Whatsapp

- LinkedIn
- > Twitter
- **13) HIGHER EDUCATION EXPERTISE:** Alumni working and studying abroad are providing their expertise to juniors with respect to new study programs and career scope for different university across the globe.

6.12 Activities and support from the Parent – Teacher Association

- Parent Teacher meeting is arranged once in a semester by each school.
- Parents meet the respective mentor assigned to their ward on the day of meeting and will come to know the academic performance and other details about the ward.
- Parents can express their views to the mentor, HoD and Dean.

6.13 Development programmes for support staff

- The Institution provides full financial support for the supporting staff to upgrade their skills through attending training programme organized by other institute/ organization.
- The Institution Deemed to be University conducts several training and development programmes for skill upgradation of supporting staff of the Institution.
- The training programmes are being organized for mid-level and senior level supporting staff.
- Workshops on Yoga and Stress Management are also organized.

6.14 Initiatives taken by the institution to make the campus eco-friendly

The Institution Deemed to be University has been conducting the green audit in the following manner.

- Green audit of the campus is carried out by the staff periodically by supervising the maintenance of the existing trees and locating places for planting new trees.
- Tree plantation is periodically done to provide a congenial atmosphere.
- From the guidance of our Honourable Prime Minister Narendra Modi, Swatch Bharat was initiated in the Institution Deemed to be University campus. The Sole message in swatch bharat is to keep our premises clean. Routine Auditing is done.

Following initiatives taken by the Institution Deemed to be University to make the campus eco-friendly.

#### • Energy Conservation

- Switching off the lights/fans in the class rooms after the class hours over, Switch-off lights in the corridors when not in use.
- Notices near the switch boards prevent the wastage of energy.
- The Usage of CFL bulbs instead of tungsten lamps.
- Open air gallery is being used for conducting college level functions in order to reduce energy consumption.
- Energy Saving CFL and LED lights have been installed in the campus.

- Retrofit of campus outdoor light poles with fluorescent lights.
- Centralized Section wise UPS systems for computers and equipment.
- Construction of buildings with more provision of natural light and ventilation.
- The UPS batteries are being maintained in good conditions.
- Installed solar water heater at Hostels.
- Turning off decorative fountains at evening and night hours.
- Usage of waste cooking oil from cafeteria for useful purpose such as lubrication, lighting etc.,
- Tightened buildings occupancy schedule.
- Conducting resource conservation awareness training programmes.
- Optimizing usage of washing machines in Hostels.
- Availability of auditoriums with range of capacities to suit the requirement to prevent over consumption of Power.
- Recirculation of water for gardening purpose using STP plant.
- Campus lighting using Solar Panels.

# • Use of Renewable Energy

- Bathing water in the hostel is treated and used for drip irrigation in the flower gardens and orchards.
- Solar water heater has been installed in the hostels
- Waste water in our university has been recycled and used for gardening.
- Solar energy is one of the sources for lights, fans, heaters used in the residences and in the college

# • Water Harvesting

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- Rain water is being stored and waste water has been recycled and used for gardening, lawns and fountains.

# • Check Dam Construction

- Open flow channels and drain pipes have been installed in the campus to collect the rain water in harvesting tank.
- The check dam not only prevents soil erosion but also stores water for different purposes especially, irrigation.

# • Efforts of Carbon Neutrality:

- University provides bus facility to the faculty members with the aim of avoiding individual vehicles and thus reducing carbon emission.
- Quarters provided to the faculty beside the campus which also minimizes the usage of automobiles.
- More saplings are planted every year in various locations to reduce the carbon load.

- Proper measures have been taken to reduce carbon emission to keep the campus, pollution-free and uncontaminated.
- The University buses and other vehicles are checked by the RTO and provided with (CNG) pollution-free stickers.
- The outside buses are forbidden to enter the university premises.
- Our university campus is declared as a plastic free zone and plastic waste is collected in a pit constructed specially for this

# Plantation

- University campus has numerous trees at various locations.
- The green ambience of the university is largely due to tree plantation

# Hazardous waste management

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- The Liquid wastes, primarily the Effluents generated by Leather Tanning Industry and Textile Industry are analyzed and treated from the point of view of separating heavy metals like chromium and harmful chemicals like various dyes and the treated water can be used for gardening and other useful purposes.
- With a view to focus on Bio- Waste Management, the VelTech TBI has set up an air-conditioned Lab consisting of state of art Equipment and Instruments. To name a few are
  - 1. "SHIMADZU" Atomic Absorption Spectrophotometer model AA- 7000 PC based and operating on WINDOWS Vista WizAArd Software with Double Beam Optics.
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More than thirty such facilities with required Chemicals, Glassware etc. are available in the Laboratory. The Incubatees are encouraged to avail the facilities at very nominal Testing charges to get the required analysis done for their Business ventures.

# • E-waste management

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- The minor repairs are set right by the staff and the Laboratory assistants; and the major repairs, by the professional technicians, and are reused.
- Have separate e-waste management facility to handle wastes such as Computers, UPS and Printing Systems etc. for its safe disposal.

The E-waste treatment Unit at the Institution Deemed to be University is a covered shed measuring 5000 Sq. Ft. area and costing around Rs.101.01 Lac. It is located inside the Institution Deemed to be

University Campus for the convenience of operations for both the Incubator and the Incubates and all the E waste machines were installed. The activities are started.

- 'E-Waste' materials consisting of obsolete hardware in adequate quantity are mobilized for carrying out treatment processes.
- Using trained manpower, the activities for the first level treatment involving manual dismantling of hardware and segregation/storage of parts (input for second level treatment) are completed for the pilot batch of obsolete hardware.

The following Machinery costing about one crore was procured in the first phase for the second level treatment is installed and the E-waste is being recycled.

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- Control Panels 2 Sets
- Power trolleys 5 nos.
- Manual Trolleys 10 nos.
- Plastic Bin 10 nos.
- Hydraulic Plastic Compactor 1 no.
- Baling unit 1 no.

# **Criterion – VII**

# 7. Innovations and Best Practices

7.1 Innovations introduced during this academic year which have created a positive impact on the functioning of the institution. Give details.

- CDIO Curricular framework for undergraduate engineering and technological programmes.
- Choice based credit system (CBCS) academic regulations for both UG & PG programmes with full flexibility in pursuing the courses.
- Integrated courses with the practical sessions to enhance students' learning.
- Implementation of Outcome based education with educational taxonomy based teaching learning and assessment & evaluation.
- 20-30% of topics in the syllabus of each subject are taught through active learning methods; Engineering hives equipped with audio-visual system, re-configurable modular tabular arrangement, clickers, etc., for delivering through appropriate active learning methods.
- Awarding credits for in-plant training, seminar, internship, independent learning through MOOCs, foreign language courses etc.
- Introducing the following new foundation courses in the B.Tech curriculam
  - Introduction to Engineering (Engineering workshop practice with product development).
  - Practical courses with open ended problem and projects.
  - Biology for engineers, etc.
- Industry involvement in Course delivery for both UG & PG programmes.
- Course delivery by professors of international repute from India and foreign institutions.
- B.Tech Final year project work through international internship in foreign institutions.

7.2 Provide the Action Taken Report (ATR) based on the plan of action decided upon at the beginning of the year

# • NBA

- 1. Received Accreditation for B. Tech Aeronautical Engineering & Mechanical Engineering for three years valid from 2017-18 to 2019-20
- 2. SAR Submitted to NBA for the four B. Tech programmes namely, Automobile Engineering, Civil Engineering, Computer Science & Engineering and Electronics & Communication Engineering.
- NAAC Institutional Information for Quality Assessment (IIQA) Submitted and Approved by NAAC
- Rankings / Ratings
  - 1. NIRF

- 77<sup>th</sup> position in Engineering
- 101 150 band in University level.
- 2. Participated in Times Higher Education (THE)
- 3. QS I-GAUGE Rating (Initial & Critical data submitted)
- Obtained AICTE approval for 10 UG Engineering programmes, 19 PG Engineering programmes, MBA programme and Ph.D programmes for the Academic Year 2018-19
- Considerable improvement product based IT companies but not significant improvement in core Engineering companies
- 26 courses (One credit) offered by experts from 24 Industries
- 35% of the final year students underwent six month/ one-year internship
- Established Vehicle Control System lab in collaboration with WABCO
- Established Artificial Intelligence/ Deep Learning centre in collaboration with NVIDIA
- More than 250 students earned the required credits (except major project) in six semesters and intensive semester, and ready for one-year internship to explore their career after graduation.
- Faculty were sent for industry internship and institutes of repute abroad
- Introduction to Engineering Course (3 credit) was designed and experiences were shared in CDIO international conference at University of Calgary.
- About 50% of the faculty employed Active Learning Methods for few of the course topics in the syllabus.
- Engineering workspaces were established in CSE & ECE for design-build experience projects.
- Improved performance in the Aptitude tests and subsequent rounds of Interviews where Quantitative, Verbal and Logical skills are examined.

7.3 Give two Best Practices of the institution (please see the format in the NAAC Self-study Manuals)

# **Best Practice I**

# TITLE OF THE PRACTICE

Six to Nine Month Industry Internship Culminating Future Ready Engineers

# **OBJECTIVE OF THE PRACTICE**

This practice primarily discusses constructive exploitation of academic flexibilities in a four-year undergraduate engineering/ technology programme in relation to enhancing the Design-Implement-Operate (DIO) skills and experiences of students by engaging them in industries for about six to nine-month time during final year of their programme as internship which culminates as their capstone. Before commencement of the freshman year, prospective students will undergo a uniquely designed/ activity-based a three-week programme called "Induction cum Acquaintance (IcA)" which gives hands-on experience to the students to have a feel about engineering. During IcA, on given themes, students in a team will physically develop a functional prototype based project which will help them to acquire implementation skills through real-world problems.

# THE PRACTICE

In freshman year, students will undergo a foundation course 'Introduction to Engineering' which addresses CDIO Standard-4 that includes engineering learning experiences and introduces essential personal and interpersonal skills. Subsequently, students will build their conceive-designimplementation experiences through one basic level and one advance level project in second and third year of the programme respectively.

Academic regulations provide enormous flexibilities to the students in terms of acquiring the demanded disciplinary knowledge and both engineering and behavioral skills to the required breadth and depth through various buckets of courses namely, foundation, core, Programme electives, Allied electives, Open electives, Value education electives, Complementary skill based courses, Independent/ self-learning courses which include seminar and Massive Open Online courses, Introduction to Engineering project, Basic level CDIO project, Advance level Capstone project, In-plant training, Industrial field visit and Internship, and learning at their own pace by registering possible number of courses based on their learning abilities.

### **EVIDENCE OF SUCCESS**

Except capstone requirement for the award of academic degree, about 60 per cent of students, socalled advance learners, earned their mandatory minimum credits from different buckets of courses by end of third year of their programme and are ready to carry out six to nine-month capstone in reputed industries in India or abroad. Out of about 400 students who are doing capstone through industry internship this year, about 120 students will get employment in the same industry and about 160 students are getting stipend from their third month based on their performance in first two months.

### **RESOURCES REQUIRED**

An Academia – Industry Integrated learning model (AIILM), which is a brainchild of Directorate of Industry Relations (DIR), provides ample scope to senior students in fourth year of the programme to interact and to get input from industry personnel to conceive unprecedented notions in solving Design – Implement problems which endow voluble comprehension in picking up capstone project in teams either in industry or in the university or part in industry and part in the university. In addition to design-implement skills, carrying out capstone at industries gives them real life/ real-time operating skills to the students which they cannot get from engineering workspaces in the institutions. Together with industries, academic experts articulated the learning outcomes referring CDIO syllabus and continuous/ end-semester assessments are made through well-defined rubrics. This AIILM facilitates to attain CDIO standards 1,2,3,4,5, 7, 8 & 9, and students are exposed to a healthy ambience which augments their Interpersonal skills, system building skills and it promotes Interdisciplinary learning culture which naturally inclines and props in attaining articulated learning outcomes.

# **Best Practice II**

# TITLE OF THE PRACTICE

Implementation of CDIO Curricular framework for Engineering Programmes

# **OBJECTIVE OF THE PRACTICE**

To transform existing programme to CDIO programme which provides students with an education stressing engineering fundamentals set in the context of Conceiving — Designing — Implementing — Operating real-world **systems** and products and is implemented for all engineering programmes in our university with input from academics, industry, engineers and students. More than 140 universities

throughout the world including MIT-USA, Chalmers University of Technology – Sweden etc world have adopted CDIO as the framework of their curricular planning and outcome–based assessment.

# THE CONTEXT

It is observed that, in the past two decades, 90% of the graduates are getting employment mostly in software industries. With the emerging opportunities in core engineering disciplines, students are not able to meet the stringent requirements of core engineering industries such as hands on skills and system approach.

Though we have been following outcome based education framework, the hands-on practices, system design thinking leading to product development approach and interpersonal skills have not been much emphasized in the curriculum. Further, many of the students who get placed in software industries also want to switch over to core engineering jobs. In fact, they come back to the college seeking support for higher studies in their disciplines in higher learning institutions.

# THE PRACTICE

The university in its effort to improve the quality of Undergraduate (UG) education revamped its UG curricula in 2009 by considering the collected inputs from various stakeholders such as industries, alumni working in higher education institutions and industries, academicians from other reputed institutions in India and abroad. Even though the curriculum helped in improving the abilities of graduates, indirect assessment from industries and alumni proved that the abilities are not on par with the expectations of their employers and the employers need to give on-job training. The university adopted the attributes of Washington accord and revamped its curriculum in 2013 to meet the programme outcomes which were derived from those attributes.

The senior faculty were trained within university and sponsored to attend various workshops on outcomes based curriculum design, and assessment methods required to measure the attainment of outcomes. In the process of implementation of outcomes based curriculum the faculty realized the difficulties related to the design and development of solution related attributes/program outcomes. The CDIO framework to develop the curriculum to define the learning outcomes, learning strategies, learning environment assessment and competencies of faculty is discussed in the series of meetings of Internal Quality Assurance Cell (IQAC) of the university. The IQAC recommended the senior academic administrators of the university to study the CDIO implementation at various institutions, to understand the CDIO standards and to identify the experiences of CDIO member institutions by attending the CDIO conferences. The visit of the members to Singapore Polytechnic (SP) to understand the transformation of the programmes towards CDIO especially for Mechanical and Electrical engineering programmes helped in identifying the requirements in terms of academic infrastructure and faculty competency. In addition to the visit to SP, the members visited Singapore University of Technology and Design (SUTD), Singapore and attended the 11th CDIO conference, Chengdu, China.

# **EVIDENCE OF SUCCESS**

- Learning outcomes are met by constructing a sequence of integrated learning experiences, some of which are experiential, that is, they expose students to the experiences that engineers will encounter in their profession.
- A curriculum organized around mutually supporting disciplinary courses with CDIO activities highly interwoven, forming the curricular structure for the sequence of learning experiences
- Design-implement and hands-on learning experiences set in both the classroom and in modern learning workspaces as the basis for engineering-based experiential learning
- Active and experiential learning, beyond design-implement experiences, that can be incorporated into disciplinary courses

Revised Guidelines of IQAC and submission of AQAR

• A comprehensive assessment and evaluation process

Our CDIO based academic process undoubtedly produces knowledgeable up-skilled graduates with professional attitude who are industry ready and who can implement and operate complex industrial machineries.

# **RESOURCES REQUIRED**

With the experiences of the members, the IQAC resolved to implement the following aspects covering various standards. (a) Creation of Active learning workspaces, (b) Improving the programme curriculum by defining measurable learning outcomes, (c) Introducing foundation courses such as in Engineering and Design, (d) Training the faculty on active learning methods and (e) Creation of C-D-I-O workspace. These aspects are emphasized in three first year programmes namely, Mechanical Engineering, Electronics and Communication Engineering, and Computer Science and Engineering. About 30% of the syllabus contents of each course were delivered through active learning modes. There are two terms in each semester and students will be doing experiments of a practical course in term one and will do one team project in term two. Students in a team must acquire engineering skills by doing one project for each practical course during their second term of the semester. In this paper, the experiences collected from the students and faculty are analyzed and presented. The constraints and difficulties in implementing different standards of CDIO are discussed.

7.4 Contribution to environmental awareness / protection

The Institution Deemed to be University has been conducting the green audit in the following manner.

- Green audit of the campus is carried out by the staff periodically by supervising the maintenance of the existing trees and locating places for planting new trees.
- Tree plantation is periodically done to provide a congenial atmosphere.
- From the guidance of our Honourable Prime Minister Narendra Modi, Swatch Bharat was initiated in the Institution Deemed to be University campus. The Sole message in swatch bharat is to keep our premises clean. Routine Auditing is done.

Following initiatives taken by the Institution Deemed to be University to make the campus eco-friendly.

- Energy Conservation
  - Switching off the lights/fans in the class rooms after the class hours over, Switch-off lights in the corridors when not in use.
  - Notices near the switch boards prevent the wastage of energy.
  - The Usage of CFL bulbs instead of tungsten lamps.
  - Open air gallery is being used for conducting college level functions in order to reduce energy consumption.
  - Energy Saving CFL and LED lights have been installed in the campus.
  - Retrofit of campus outdoor light poles with fluorescent lights.
  - Centralized Section wise UPS systems for computers and equipment.
  - Construction of buildings with more provision of natural light and ventilation.
  - The UPS batteries are being maintained in good conditions.
  - Installed solar water heater at Hostels.
  - Turning off decorative fountains at evening and night hours.
  - Usage of waste cooking oil from cafeteria for useful purpose such as lubrication, lighting etc.,
  - Tightened buildings occupancy schedule.
  - Conducting resource conservation awareness training programmes.
- Optimizing usage of washing machines in Hostels.
- Availability of auditoriums with range of capacities to suit the requirement to prevent over consumption of Power.
- Recirculation of water for gardening purpose using STP plant.
- Campus lighting using Solar Panels.

### • Use of Renewable Energy

- Bathing water in the hostel is treated and used for drip irrigation in the flower gardens and orchards.
- Solar water heater has been installed in the hostels
- Waste water in our university has been recycled and used for gardening.
- Solar energy is one of the sources for lights, fans, heaters used in the residences and in the college

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7.5 Whether environmental audit was conducted?

✓ NO



7.6 Any other relevant information the institution wishes to add. (for example SWOT Analysis)

#### Some major areas of strength of the Institutions Deemed to be University

- Academic Flexibility through CBCS implementation (Vertical/ Lateral mobility)
- Outcome Based Curriculum Design, Teaching-learning and evaluation
- Adoption of Conceive-Design-Implement-Operate (CDIO) curricular framework to enhance students' personnel, professional and inter-personnel skills

Yes

- Teaching Developers Initiative (TDI) A forum to innovate and enhance teaching-learning practices of faculty members
- Engineering hives for Active Learning methods (Problem based learning, peer instruction, think-pair-share etc.)
- CDIO workshops for product development form first semester onwards
- Industrial visit/ In-plant Training/ Internship for all the students
- Industry supported laboratories for students' learning & project work
- Course delivery by industry personnel/ industry experts
- More than 80% of the students' project carried out in industries
- About 70 patents filed by students together with project guide
- Regular participation of students in national and international design project contest/ competitions
- Accredited by NAAC with 'A' grade (CGPA 3.17) in 2015 for the period of 5 years
- National Institutional Ranking Framework (NIRF) ranked 58 in Engineering category and 65<sup>th</sup> in University category in NIRF India Rankings 2017
- Times Higher Education (THE) ranked 43<sup>rd</sup> in ASIA & 74<sup>th</sup> in the world under Young University category
- Placement training given to the students from 2<sup>nd</sup>semester onwards

#### Areas of weakness of the Institution Deemed to be University which can be improved upon

- Intake in PG & PhD Program is less.
- Scholarships for PG & full time PhD students are less.
- Interdisciplinary program at UG & PG are few.
- Assessment & evaluation can be improved by adopting different approaches.

### 8. Plans of institution for next year

- 1 Providing hostel accommodation for about 90% of the student strength.
- 2 Minimum of 5% international faculty
- 3 Minimum of 5% international students
- 4 Staff quarters for 10% of the faculty
- 5 Demand ratio (Students applied: Admitted) 20:1
- 6 Placement (On campus, Off campus, Higher studies and Entrepreneur) : 100%
- 7 QS World University Ranking & THE World university ranking
- 8 50% of the faculty with Ph.D qualification
- 9 30 % of Ph.D Faculty involved in Sponsored Research
- 10 Number of new sponsored research projects 50% of the faculty Ph.D qualified faculty
- 11 ABET accreditation for two programmes/ IET accreditation for couple of programmes
- 12 Visiting faculty international 25
- 13 Semester Abroad Programmes (Outward) 250
- 14 Internship / Semester Abroad Programmes (Inward) 70
- 15 Internship Abroad 250
- 16 Industry internship 20% of the total strength
- 17 Establishing research facilities for Battery Engineering
- 18 Curricular/ Academic Regulations Reforms towards producing future ready engineers
- 19 Encouraging students to participate in more number of reputed International/ National project competitions
- 20 New library building (Completing one lakh sq. ft. in two lakh sq. ft.)
- 21 25% of the full time Ph.D candidates
- 22 Generating decent revenue through consultancy
- 23 Quality of research publications and sponsored research projects
- 24 NSS and NCC: Blood donation Camps, Awareness Programmes, NSS and NCC Camps National and International days' celebrations, Swachh Bharat, Tree plantation programs, Scribe Exams, Rallys etc.
- 25 Club Activities: Religious festival celebrations, National and International day celebrations, Inter and Intra Cultural programs, Lavaza '18
- 26 Sports: South zone and inter zone matches, Inter and Intra University Invitation matches and Annual sports day
- 27 RFID tagging to all the documents in the Central Library

Name Name Dr.V. Ramachandran Prof. Dr.A ice Chancellor Signature of the Signature \*\*\*

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# Annexure I

# Abbreviations:

CAS	-	Career Advanced Scheme
CAT	-	Common Admission Test
CBCS	-	Choice Based Credit System
CE	-	Centre for Excellence
СОР	-	Career Oriented Programme
CPE	-	College with Potential for Excellence
DPE	-	Department with Potential for Excellence
GATE	-	Graduate Aptitude Test
NET	-	National Eligibility Test
PEI	-	Physical Education Institution
SAP	-	Special Assistance Programme
SF	-	Self Financing
SLET	-	State Level Eligibility Test
TEI	-	Teacher Education Institution
UPE	-	University with Potential Excellence
UPSC	-	Union Public Service Commission

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