2016

Annual Quality Assurance Report

TU

Thapar Institute of Engineering & Technology University, Patiala

15/30/2016

Part – A

AQAR for the year

> 2015-16

1. Details of the Institution

1.1 Name of the Institution

> Thapar Institute of Engineering and Technology University

1.2 Address Line 1

> Patiala

Address Line 2

> Punjab

City/Town

> Patiala

State

> Punjab

Pin Code

> 147004

Institution e-mail address

> dopa@thapar.edu

Contact Nos.

> 9815604119

Name of the Head of the Institution:

> Prof. Prakash Gopalan

Tel. No. with STD Code:

> 0175 2393001

Mobile:

> 8283827635

Name of the IQAC Co-ordinator:

> Dr Aiav Batish

Mobile: 9815604119

IQAC e-mail address: abatish@thapar.edu

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 corner- bottom
   of your institution's Accreditation Certificate)

EC (SC)/15/ A & A 22.3 dated May 25, 2016

1.5 Website address: www.thapar.edu

Web-link of the AQAR: http://www.thapar.edu/images/AQAR%202015-16.pdf

1.6 Accreditation Details

Sl. No.	Cycle	Grade	CGPA	Year of Accreditation	Validity Period
1	1st Cycle	B++		2002	5 years
2	2nd Cycle	A	3.15	2009	5 years
3	3rd Cycle	A	3.14	2016	5 years
4	4th Cycle				

1.7 Date of Establishment of IQAC : DD/MM/YYYY   04/12/2009

1.8 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 2012-13 submitted to NAAC on 11/10/2013**
   ii. **AQAR_2013-14 Submitted to NAAC on 30/12/2014**
   iii. **AQAR__2014-15 submitted to NAAC on 30/12/2015**
   iv. **AQAR_15-16 submitted to NAAC on 15/12/2016**

1.9 Institutional Status

University   State ☐   Central ☐   Deemed ☐   √   ☐

Affiliated College   Yes ☐   No √

Constituent College   Yes ☐   No ☑

Autonomous college of UGC   Yes ☐   No ☑

Regulatory Agency approved Institution   Yes ☑   No ☐

  (E.g. AICTE, BCI, MCI, PCI, NCI)

Type of Institution   Co-education ☑   Men ☐   Women ☐

                 Urban ☑   Rural ☐   Tribal ☐

Financial Status   Grant-in-aid ☐   UGC 2(f) ☐   UGC 12B ☐

            Grant-in-aid + Self Financing ☑   Totally Self-financing ☐

1.10 Type of Faculty/Programme

     Arts ☐   Science ☑ Commerce ☐   Law ☐   PEI (Phys Edu) ☐

     TEI (Edu) ☐ Engineering ☑   Health Science ☐   Management ☑

     Others   (Specify)   [.]

1.11 Name of the Affiliating University *(for the Colleges)*   [NA]

1.12 Special status conferred by Central/ State Government-- UGC/CSIR/DST/DBT/ICMR etc

   Autonomy by State/Central Govt. / University   [Deemed University]

   University with Potential for Excellence [NO]   UGC-CPE [ ]

   DST Star Scheme   UGC-CE   [ ]

   UGC-Special Assistance Programme [☑]   DST-FIST [☑]

   UGC-Innovative PG programmes [ ]   Any other *(Specify)* [TEQIP - II]

2. IQAC Composition and Activities

2.1 No. of Teachers

7

2.2 No. of Administrative/Technical staff

9

2.3 No. of students

2

2.4 No. of Management representatives

1

2.5 No. of Alumni

1

2. 6 No. of any other stakeholder and

   Community representatives

0

2.7 No. of Employers/ Industrialists

1

2.8 No. of other External Experts

3

2.9 Total No. of members

20

2.10 No. of IQAC meetings held

3

2.11 No. of meetings with various stakeholders: No.   Faculty

3   √

Non-Teaching Staff Students   Alumni   Others

2.12 Has IQAC received any funding from UGC during 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.	International	National	State	Institution Level
2				2

   (ii) Themes   Quality Improvement & Contemporization

2.14 Significant Activities and contributions made by IQAC

Attached as annexure-I, II

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
Attached as annexure I and II	

   * *Attach the Academic Calendar of the year as Annexure. (***Academic calendar is attached as annexure-VII***)*

2.15 Whether the AQAR was placed in statutory body   Yes √   No ☐

        Management √   Syndicate ☐   Any other body ☐

Provide the details of the action taken

Attached as annexure I and II

Criterion – I

1. 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	All Disciplines	Nil	All	All
PG	29	0		
UG	14 (BE/BTECH)	1	All	All
PG Diploma				
Advanced Diploma				
Diploma				
Certificate				
Others				
Total	47	0		

Interdisciplinary	2(Mechatronics and Electronics & Computer Engg)			
Innovative				

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

Pattern	Number of programmes
Semester	All
Trimester	NIL
Annual	Nil

1.3 Feedback from stakeholders*   Alumni   Parents   Employers   Students
    (On all aspects)   √   √   √

        Mode of feedback   :   Online   √   Manual   Co-operating schools (for PEI)

1.4 Whether there is any revision/update of regulation or syllabi, if yes, mention their salient aspects.

Salient features of the curriculum review of UG and PG courses

- Inclusion of a course on Innovations in Technology Enabled Learning for Online Environment of 4 credits in scheme of PhD for CSED.
- Introduction of Capstone Project of 5 credits to 3rd Year students (2013 batch) of BTech (Biotechnology).
- Calculation for 30 credits without considering credits of self-effort hours for registration of courses in a semester.
- The harmonized UG schemes and syllabi of 3rd and 4th year applicable for 2015 batch students under contemporization program with Trinity College Dublin has been finalized.
- Inclusion of a new course entitled Innovation and Entrepreneurship of 4.5 credits as per the recommendation from Trinity College Dublin in all UG programs w.e.f. 2014 batch students.
- The syllabi of courses Applied Physics and Engineering Materials offered by School of Physics and Materials Science in 1st and 2nd year of UG programs applicable to 2015 batch onwards has been revised.
- The scheme of BE (Electrical Engineering) 8th semester (Alternate Project Semester) for 2009-2013 batches has been revised to include the course titled Modern Physics (UPH061).
- The scheme structure and course objectives of M.Tech (Biotechnology)has been revised as:
- Two subjects (PBY205 and PBY209) were made compulsory and merging of their specializations (Plant molecular pharming and stem cell and tissue engineering) with respective subjects.
- A course named as Advanced Data Structures (PCL102) has beenreplaced with a new course on Bioremediation Technology.
- The program outcomes of MSc and M.Tech (Biotechnology) along with revised CLOshave been revised.
- The syllabi, CLOs and the course structures have been revised for the following courses by Mechanical Engineering Department:
  - PTH207
  - PTH101
  - Seminar
  - Minor Project
  - Dissertation
- Changes have been made to Scheme & Syllabus of MSc (Physics) 2016, MSc (Chemistry) and MSc (Bio-Chemistry) for 2016 batch onwards and 3rd & 4th semester of 2015 batch have also been revised.
- The scheme of M.Tech (Chemical Engineering) has been revised with updated Course Learning Objectives (CLOs).
- The following changes were made in the scheme & syllabus of MTech (Energy Technology & Management):
- Modifications in some course structures MTech (Energy Technology and Management)
- Grouping of electives in Semester II of MTech – Environmental Science and Technology
- Replacing Remote sensing and GIS Analysis (PES104) in First Semester of MTech (EST) with a parallel course that is elective Remote Sensing and GIS (PIN103) being taught to MTech (Civil Infrastructure Engineering).
- The schemes of ME (Structural Engineering) and ME (Civil Infrastructure Engineering) applicable to 2015 batch onwards have been revised.
- The Department of Electronics and Communication Engineering (ECE) made a change by swapping Elective-II course (7th Semester) with Modern Control Theory (6th Semester)in the scheme of 2013 batch.
- The Department of Electronics and Communication Engineering (ECE) included a course with the name Data Structures and Analysis in the scheme for 2013 batch.

Computerization of Academic and other activities

- A total of 74 class rooms of university have been equipped with LED projectors. During this academic year a total of 32 LED projectors have been purchased and out of which 30 have already been installed in the class rooms and 2 are available in Centre Store to be issued on need basis.
- A total of 56 class rooms of the university are equipped with PA systems out of which 30 PA systems were purchased during this academic year to install fresh/replace the older ones.
- 2 classrooms of the university are converted to smart classrooms for live recording of lectures and recorded video/audio lectures and uploaded on website and are used as resource for students.

Other information regarding the academic activities during the period

- Prepared the procedure for court of examiners and examination board and implemented the same for UG students.
- 10 new classrooms were added during this academic year to academic infrastructure along with furniture and other needs.
- Ms. Inayat Gupta, an alumnus of TIET University belonging to 2014 batch topped in Punjab Civil Services Examination-2016 (PCS) during this academic year. The University honoured Ms. Inayat Gupta for her great achievement by inviting her in University campus.

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

CENTRE FOR TRAINING & DEVELOPMENT (CTD)

CTD was set up in May 2015 with Mr. Sanmeet Sidhu as its Head. The Centre is responsible for identifying and addressing training & development needs for students and teaching & non-teaching staff of TIET University& LMTSM.

Key Responsibility Areas:-

1. Responsible for designing and implementing student training lifecycle under **Smart Skill Development Program** (SSDP) aimed to improve campus placements and make students more Industry & Society ready.
2. Ensure that students at TIET University and LMTSM are nurtured, trained and transformed into employable, future ready, global resources.
3. Provide on-campus mentoring and career counseling sessions for students.
4. Responsible for designing and implementation of training programs for teaching and non-teaching staff under **Staff Development Program** (SDP) to cover technical and behavioral aspects of work, train faculty on new developments in educational delivery system and best practices in instructional technology and pedagogy.
5. Identify, select and manage external training and accreditation bodies, agencies and providers necessary to deliver required training to appropriate standards.
6. Oversee administration and delivery of standardized tests like the GMAT (Pearson Testing) with technical support from Centre for Information & Technology Management.

Programs Conducted During the Academic Year July 2015- June 2016

A. Programs for Students

1. Placement Symposium: This is an event for final year UG and PG students, where exhaustive concept and practice GDPI (Group Discussion and Personal Interview) sessions are organized for the participants, with a comprehensive performance feedback, enabling them to bridge the gap between actual and expected levels. It was scheduled from **August 03- August 07, 2015**. Each of these days, students of a different branch were trained on employability related challenges. Day long concept sessions were held in the C-Hall; there were five sessions in all spanned across one and a half hours each:-"Marketing Yourself", "How to excel in Group Discussions", "How to excel in Interviews", "How to brace up for Aptitude Tests" and "Preparing a winning Resume". Parallely, students were made to participate in Group Discussions, Case Studies and Interviews; every student got to experience one GD, one Case Study and one Interview. The sessions were taken by in house team as well as professionals with relevant experience; these professionals represented diverse facets of industry and academia and included trainers who are entrepreneurs, established authors as well as from premier institutions like the IIMs. Training was imparted to over 600 students and was well received by them. On the last day, an Aptitude Test was organized, covering areas like Quantitative, Verbal and Logical Reasoning. Apart from giving the students a near real experience of the actual process the Symposium was also used to segment students into three different groups, based on performance across multiple parameters ---- the weights given to different parameters were--- 20% for CGPA, 30% for Symposium Interview, 15% for Symposium Group Discussion, 15% for Symposium Case Study and 20% for the Aptitude Test. Top 165 students (based on the above parameters) were nominated as members of the 'Thapar Achievers' Club (TAC)', others were segmented into two different groups. The same event was replicated at LMT School of Management on **August 27, 2015**, for final year MBA students. On the basis of this, the training needs of the students were identified and programs were conceptualized and conducted. Training was imparted on weekends (Fridays & Saturdays) for Aptitude & Personality Development.

2. Thapar Achievers' Club (TAC): This comprised a group of key performers in the Placement Symposium, based on a multiplicity of factors. The students of this group got advanced level training inputs so that the incremental efforts which they needed to put in, were judiciously channelized. Training was imparted on 8 weekends (in the months of September, October, November) on campus by a high end Industry expert with proven experience in mentoring, motivating and guiding students. Total number of training hours was 48. Out of the 165 members of TAC, 90% were placed till November 2015.

3. Smart Skills Development Program (SSDP): This is a carefully crafted training program for students in different years of UG/PG. It is based on the vision of bracing students with a range of industry and society centric skills - effective communication & presentation, interpersonal skills, group dynamics, problem solving, decision making, data analysis, cultural sensitivity, change management – collectively known as 'Smart Skills'. While thrust is more on concepts & fundamentals for students in formative years, there is a strong application orientation for students in conclusive years of UG/PG. Training is imparted on weekends and select weekdays without disturbing the academic equilibrium.

This is an ongoing program and done on 10 weekends in each academic semester. The following SSDP programs were done in the academic year July 2015 to June 2016:-

- Effective Presentation & Interview Skills – conducted for BE 3rd year. This was done on Saturdays & Sundays, 8 hours per day, on 8 weekends
- Communication & Group Skills – conducted for BE 3rd year. This was done on Saturdays & Sundays, 8 hours per day, on 8 weekends
- Practice GDs/PIs – conducted for BE final year & PG final year, and MBA final year (LMTSOM). This was done on Saturdays, 8 hours, on 8 weekends at TU and on Saturdays (3 hours) on 8 weekends at LMTSOM
- Aptitude Training – conducted for Final Year MBA students of LMTSOM. This included study material and online access to training aids.

January 2016- May 2016

- Communication & Behaviour Training – done for BE 2nd year and PG 1st year students, on Saturdays.
- Aptitude Training – done for BE 3rd year, MCA 3rd year and PG 2nd year students, on Saturdays at TU; done for MBA first year on Fridays for LMTSOM.
- GDPI training – done for BE 3rd year, MCA 3rd year and PG 2nd year, on Saturdays/Sundays.

4. Skill Studio

Skill Studio is an interactive student centric learning platform to create awareness w.r.t 'Smart Skills'. We believe that these 'Smart Skills' will brace the students with the desired skill component (along with technical skills) to perform well in Campus Placement selection tools. Additionally, they will also facilitate a candidate to acclimatize with organizational culture and walk confidently along professional and personal paths. Sessions cover a wide range of topics like Group Discussions, Personal Interviews, Effective Communication, Quantitative & Verbal Aptitude, Resume Building, Emotional Intelligence, Industry Readiness, Corporate Social Responsibility etc. Sessions are scheduled every Wednesday @ 5:30 pm. It is an initiative to make students experience the diversity of skills imperative for positive contribution and growth. Learning is encouraged though participative techniques using simulations, work sheets, role plays and team activities.

5. Industry Sensitization Programs

A session on 'Effective Communication as a tool for success' by **Mr. EV Gireesh, Corporate Trainer & Life Coach, Mumbai.** Mr Gireesh, an international transformational speaker and success coach with clients like ISRO, NABARD etc, addressed B.E final year students on **September 20, 2015** in the TAN auditorium. The principles of effective communication were put across in a very participative and empirical manner, thus helping students to realize the power of communication in professional life. Students were also encouraged to come forward and make impromptu presentations, which were followed by a comprehensive feedback by the resource person.

A session on 'Career Options and Test Taking Techniques' on **October 06, 2015** by experts from GMAC, Graduate Management Admission Council, the organization which administers the GMAT globally. The session was attended by over 100 students from different years of BE. The objective was to give inputs on strategic test taking techniques to help students to do better in various general aptitude tests. The session also addressed various career related queries of students, particularly the ones keen on pursuing management after engineering.

A session on 'Decoding Indian Economy for Engineers' for B.E second and third year students on **November 03, 2015** in the main auditorium. The resource person was Ms. Manika Prem Singh, an entrepreneur economist with rich industry experience including that of having worked with the erstwhile National Planning Commission. The session spanned over two hours and dissected Indian Economy in a very interesting manner for the participants. It was an insightful experience for the engineers to know the various ways in which Economy could have a bearing on the technical and general environment of the country. The session touched upon basic concepts of Economy and then graduated to explain the inter linkages of these economic dimensions with the business and social fabric of the country. It was followed by a participative interaction between the students and the resource person.

A session on 'Project Management' for B.E third year students on **November 27, 2015** in the main auditorium. The resource person was Mr. Vishal Narain Dar, Regional Director (North), PMA, India. The session, spanned across an hour, introduced the participants to the concept, issues, challenges and skills for effective project management. The key touch points of the session were as under:-

- Concept of Project Management

- Myths about Project Management

- Trends in Project Management

- The role of PMA as an exclusive Indian member of the International Project Management Association (IPMA)- the first global association of project practitioners, with members from 58 nations

- Certification process/benefits for being an IPMA level D project management associate

- The session was well received by the students and was followed by an open house, wherein the students interacted with the resource person to clarify their doubts.

- A session on 'Workplace Ethics & Gender Sensitivity' was organized for all Ph.D students on March 16, 2016. The session was conducted by Ms. Aparna Jain (legal consultant and member of ICC) and was attended by over 80 plus enthusiasts. The session appreciated the importance of ethics at Workplace with particular reference to gender sensitivity.

B. Programs for Staff: These programs are designed for both teaching and non teaching staff. The focus areas of the programs include both technical and behavioural aspects of work. The following programs were conducted in the academic year July 2015- June 2016:-

1. A half day long Faculty Orientation Program on **September 17, 2005** in the C-Hall. The session was taken by the TU in house team. The key touch points of the session were as under:

- Faculty Roles & Responsibilities
- Instruction Planning, Instruction Delivery & Student Evaluation
- Synergizing student activities with the overall curriculum
- Academic Collaborations & Partnerships
- Research & Sponsored Projects
- Academic Administration & HR Equilibrium

2. A one week long training program for new faculty recruits from **September 21-25** in the C-Hall. The session was conducted by experts from National Institute of Technical Teachers' Training and Research (NITTTR), Chandigarh. The objective of the programme was to orient the faculty members on certain vital dimensions of academic pedagogy. The main touch points of the workshop were as under:-

- · Learning & Principles of Learning
- · Task Analysis
- · Writing Objectives
- · Instructional Methods: Case Study, Brainstorming & Seminar
- · Planning, Organizing & Evaluating Practical Work
- · Classroom Communication
- · Setting Question Papers
- · Tools for e-content generation
- · Motivating Students
- · Lesson Planning
- · Sustainable Development: Role of Teachers

The workshop, attended by 30 faculty members, was highly interactive and concluded with a set of presentations by the faculty members with a comprehensive feedback by the NITTTR team.

3. A two day long workshop on "Enhancing performance at work place' was conducted by NITTTR on **December 1 & 2, 2015.** This was done for non teaching staff and comprised modules on Attitude, Behaviour, Interpersonal Relation, and Emotion Management & Computer Skills.

4. A workshop for non teaching staff on 'Gender Sensitivity & Sexual Harassment at Workplace' on **December 23, 2015**. The workshop was held in the C-Hall, conducted by Ms. Aparna Jain (legal consultant and member of ICC) and chaired by the OSD in the presence of the Registrar and Ms. Alpna Aggarwal (Chairperson, ICC). It was attended by over 50 participants and appreciated the key issues related to sexual harassment. The resource person gave insights into various challenges surrounding gender sensitivity at workplace and supported them with examples from day to day life. The relevance of the topic was further enhanced through participative case studies.

5. A workshop on 'Enhancing Productivity at workplace' was conducted on **February 6, 2016** for employees of Central Stores and Finance. This was done by a Chandigarh based organization : Mind & Heart Foundation. It was conducted through participative techniques and focused on aspects like stress management, time management, communication & behaviour.

6. A day long workshop on 'Workplace Safety & Disaster Management' was conducted on **June 16, 2016** for clerical and support staff members (as nominated by the Registrar). The resource persons were outsourced from Momentum India (a national training organization based in Delhi) and covered areas like management of medical emergencies, basic Fire Fighting Techniques and disaster management. Training was imparted through practical methods employing filed activities.

Venture Lab

As a part of contemporization programme, an Innovation Centre/Venture Lab is set up at TIET University similar to "LaunchBox, Trinity's student incubator". It is running accelerator program open to teams of students (undergrad and postgrad) with an early-stage business idea. This unique incubator provides coaching, expert advice, seed funding and access to space and facilities needed to test out and launch new ventures. The program supports students in developing investor-ready ventures and is supported by a network of TIET University alumni and friends.

A comprehensive program is initiated with University of Groningen (UoG). A 10-member delegation visited University of Groningen and Twente to develop a framework and experience pedagogy for its replication at TIET University. A comprehensive course scheme and syllabi along with learning material is developed. Full course on Innovation & Entrepreneurship will be started from next semester. An extra-curricular course will be offered to interested students during 2nd year. Start up semester in lieu of project semester for interested students. Implement an open web-based database that provides content on innovation and commercialization processes to self-registered users and business partners.

Criterion – II

2. Teaching, Learning and Evaluation

2.1 Total No. of permanent faculty

Total	Asst. Professors	Associate Professors	Professors	Others (Visiting Professors & Lecturer)
348	177	47	36	88

2.2 No. of permanent faculty with Ph.D.

251

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

Asst. Professors		Associate Professors		Professors		Others		Total	
R	V	R	V	R	V	R	V	R	V
31		10		4		79		124	

2.4 No. of Guest and Visiting faculty and Temporary faculty

88
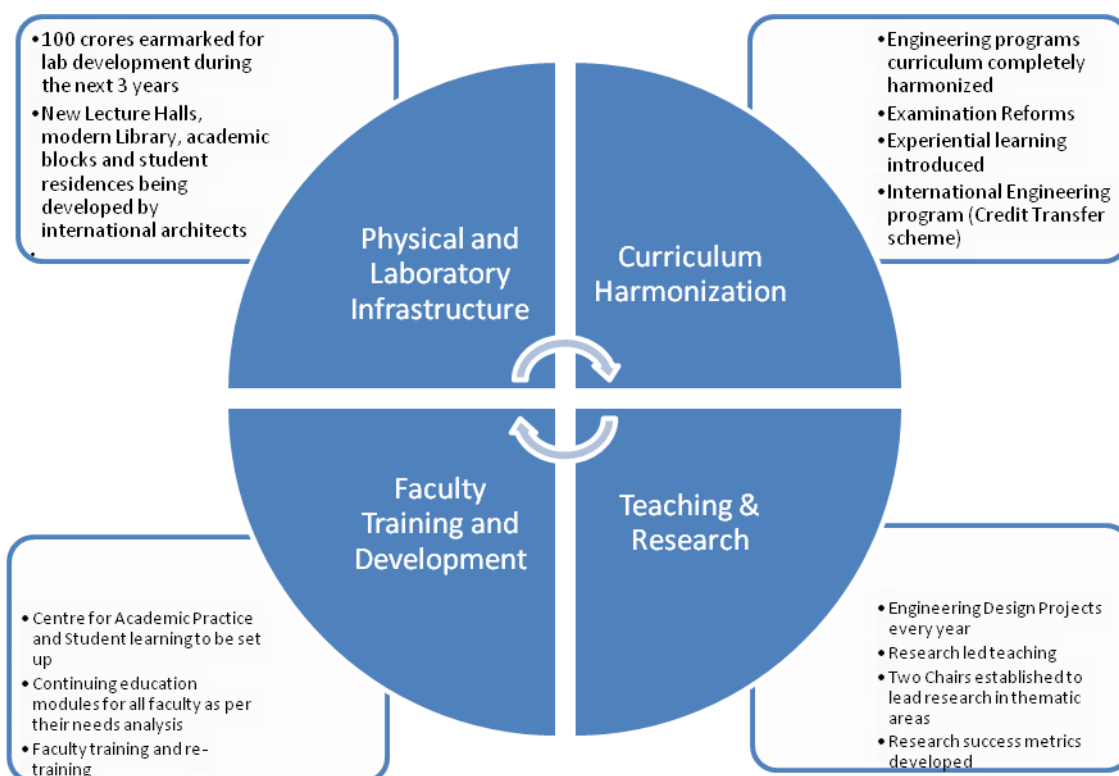
2.5 Faculty participation in conferences and symposia:

No. of Faculty	International level	National level	State level
Attended Seminars/ Workshops	29	58	86
Presented papers	30	59	32
Resource Persons	9	55	80

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

Contemporization Programme – Thapar University

In line with its mission to provide world class educational experience by incorporating global best practices in its format, TIET University has embarked on a Contemporarization Program under academic mentorship of Trinity College Dublin, the University of Dublin, Ireland. The Contemporarization Program has been designed to deliver a research inspired; outcome based educational experience to the students in partnership with Trinity, an international university of repute. The unique collaboration has been contemplated to give students a flavour of international educational experience, prepare them for professional careers, and expose them to state of the art facilities and cutting edge research in the fields of engineering and science. The broad scope of this collaboration covers all the major academic and research activities of TIET University including developing a outcome based teaching pedagogy, research orientation including supporting lab infrastructure, academic curriculum harmonization, physical Infrastructure, faculty training and development, and develop new joint programs. The broad scope of the agreement is depicted in the figure below.

Physical and Laboratory Infrastructure
- 100 crores earmarked for lab development during the next 3 years
- New Lecture Halls, modern Library, academic blocks and student residences being developed by international architects

Curriculum Harmonization
- Engineering programs curriculum completely harmonized
- Examination Reforms
- Experiential learning introduced
- International Engineering program (Credit Transfer scheme)

Faculty Training and Development
- Centre for Academic Practice and Student learning to be set up
- Continuing education modules for all faculty as per their needs analysis
- Faculty training and re-training

Teaching & Research
- Engineering Design Projects every year
- Research led teaching
- Two Chairs established to lead research in thematic areas
- Research success metrics developed

As a first step towards embarking on this journey to contemporize the academic systems and processes at Thapar University, an Academic Review of the engineering departments at TIET Universitywas completed by a team of experts from Trinity College Dublin in November 2014 on our request. Trinity submitted a detailed written report about the findings. The objective of the review was to identify the gaps between the current performance levels of Thapar and the targeted levels which would take Thapar education systems to a significantly higher paradigm. The review process covered review of curriculum, research, staffing, infrastructure, governance, academic and administrative decision making, strategic and implementation planning encompassing much of the entire academic culture of the University. The findings report set out a path, by means of a set of recommendations, to achieve a closing of the performance gap. There were also some observations and recommendations which are core to the contemporisation process. An overall plan for change was then prepared. For implementing the findings of the academic review, as a first step the harmonization of curriculum was taken up to bring it up to date with global standards. The second academic review was undertaken by Trinity in January 2016 and all postgraduate programs and programs offered by the Schools were covered.

Pedagogy

The teaching pedagogy employed for the engineering programmes offered at TIET Universityreflect the long held ethos that engineering education should be broad-based to enable graduates to develop throughout their professional careers, finding solutions for as yet unseen challenges. The partnership with Trinity focuses on strategies to deliver a research inspired, outcome based educational experience to the students at all levels. This is a major shift in focus from the current content-oriented imparting of engineering education to a project-based and outcome-oriented educational experience. The new teaching pedagogy lays emphasis on applying engineering skills through relevant engineering design projects, improving team-working skills and awareness of issues relating to ethics and professionalism. Also, all academic staff is encouraged to bring in cutting-edge research ideas from their own research into their teaching

TIET University will sponsor two high impact Chair Professors (research) positions at Trinity in thematic research areas of interest to both partners. The Professors would spend time both at Thapar and Trinity and would lead a major research effort which will culminate into setting up of a State of the Art research centre at Thapar in the next five years. The thematic areas will be inter-disciplinary and would involve several other academic staff. The teams would focus on attracting large research funding and publications in high impact journals.

Thapar is also setting up a Research Committee to establish a structured PhD program, form inter-disciplinary research groups, encourage/ support the academics to publish, take research students, raise research funding and feed this knowledge into advanced undergraduate and postgraduate courses and oversee the setting up of a major Research Centres. The committee will review the metrics for measurement of research output (Publication quantity and quality, PhD student(s) produced, research funding raised, measures of innovation and impact).

The committee will identify research thematic areas in consultation with TCD which will be pursued during the next 5 years.

Faculty Training and Development

As part of the Contemporisation Programme, TIET University is also setting up a Centre for Academic Practice and Student Learning (CAPSL) which is similar to the 'Trinity's CAPSL unit. Through this centre, TU will expose the 'entire faculty to in-house learning modules including e-learning during the next 3-5 years. An academic needs' analysis is currently underway based on the questionnaire which has been administered to all academic staff. The Senior Academic Developer from Trinity will act in a consultancy role to help Thapar establish the CAPSL centre that will have the skills, knowledge and ability to assist Thapar to achieve its institutional mission and strategic goals. As the centre gets established the CAPSL unit will draw from academic staff across different disciplines with specific interest in and knowledge of different aspects of higher education pedagogy. CAPSL will have one senior academic developer from Trinity and two e-Learning technologists: continuous professional development (CPD) modules and certified programmes will be delivered by CAPSL staff, which will be continuously supported by Trinity academics and other staff. A number of specific needs have been identified (i) Training of all Thapar academic staff, (ii) Awareness training of senior staff (iii) Training of trainers to enable self-sufficiency. The training programmes will be developed based on core needs identified. Trinity staff and associates will deliver this programme at Thapar during the academic year. Each module will comprise 2 two-hour workshops and assessment exercises: participants will be provided with all necessary materials. The existing curriculum will be adapted to reflect the specific academic needs of Thapar faculty. A mentoring programme can also be provided. Participants will be required to submit a teaching portfolio for assessment, which will be developed over the course of the year and will relate to their teaching and learning. Successful candidates will be awarded a Special Purpose Certificate Academic Practice. Trinity in consultation with Thapar will agree the core modules that will form part of the special purpose certificate.

The training of all academic staff and on-going professional development will be instrumental in establishing the culture necessary for the CAPSL Centre to grow and contribute meaningfully to the contemporisation programme.

An Innovation Centre/Venture Lab has been set up at TU to run accelerator program open to teams of Thapar students (undergrad and postgrad) with an early-stage business idea. This unique incubator will provide coaching, expert advice, seed funding and access to space and facilities needed to test out and launch new ventures. The program will support students in developing investor-ready ventures and will be supported by a network of Thapar alumni and friends.

Examination Reforms

Each department/School has constituted an Examination Board for each year of study. All the instructors teaching courses to that batch (defined by the year of admission) form the members of the board. An external member will be appointed only for the senior years of the UG program (one for Year 3 and another for Year 4) and the final year of the PG programs.

The course instructor prepared the question papers along with model solutions which were sent for review to Trinity in October 2015.

Minimum Pass Marks

It is important to realise that the marks in individual papers are essentially useful symbols for grading and ranking students in a course in a consistent and equitable manner. The present grading system of awarding grades based on total marks obtained by the students would be applicable as documented in the Academic Regulations approved by the Senate. However, for each individual course a minimum of 33 marks would be required to be obtained by the student to pass the course with the lowest pass grade. In all project based courses (those courses where no formal written examination is conducted (e.g. Project Semester, Engineering Design II or III) a minimum of 50 marks will be required to pass the course.

For the purpose of awarding grades, all students with marks less than 33 were awarded "E" (fail) grade. The normal distribution curve was used to award grades as per the existing regulations at TU. The minimum marks considered for assessing the normal distribution will be 33. This would mean all students at 33 will be automatically awarded "C" grade and other grades will be awarded based on normal distribution. **The Examination Board is the highest body deciding on matters related to the examination results in a department/school**. The AVGP and other matters related to final grading is also its sole discretion.

Spread sheet with provisional grades

All the academic staff entered marks in the ERP system as is the current practice. The internal examiners also proposed a grade for each student considering the guidelines listed above. The DOCA office then prepared a spread sheet of the total marks obtained by each student along with the grades proposed by the internal examiner.

The Examination Board will review all the marks and may pass a student if he has up to two courses with no less than 30 marks and above 33 in all other courses. Similarly, the board may consider passing a student who has at least 27 marks in one course and more than 33 in all the remaining courses. All student results will be reviewed on a case by case basis. The Examination Board will also review the answer scripts on a sampling basis to check for consistency against the model solutions provided earlier.

Course Learning Outcomes (CLO)

The attainment of course learning outcomes was measured for the courses offered during this semester. We had conducted CLO surveys as an in-direct measurement of CLO's twice in the semester (once before the Mid Semester Test and again before the End Semester Exams. Subsequently, a direct measurement of student performance from the questions asked during exams during the semester as linked to learning outcomes was also completed. The scores from the direct and in-direct measures were then combined to assess the overall attainment of course learning outcomes and objectives.

ACTION TAKEN REPORT – ACADEMIC REVIEW 2016

An Academic Review of departments and schools at TIET University was completed by Trinity during Jan 2016. A detailed report about the findings of the review was received. The objective of the review was to identify the gaps between the current performance levels and those levels which would be needed to help Thapar rising to a university of significance on the global stage. The academic review covered curriculum, research, staffing, infrastructure, governance, academic and administrative decision making, strategic and implementation plan are encompassing much of the entire academic culture of the University. The findings report set out a path, by means of a set of recommendations, to achieve a closing of the performance gap. There were also some observations and recommendations which are core to the contemporisation process. A substantial overall plan for change was thereafter prepared. The academic review thus became a first step to develop an action plan for implementing the necessary changes.

Research Professorships - Joint TCD / Thapar Chairs

The Engineering Chair will be named KC THAPAR Chair Professor in Engineering and the Computer Science Chair will be titled LM THAPAR Chair Professor in Computer Science. TIET University will transfer the 50% of the annual amount payable for the two chairs by Jan 31, 2016. An invoice has been received from Trinity which is being processed.

TIET University will be involved in the selection process of the two chairs and Director TIET University or his nominee will act as a member of the selection committee. TIET University will also be represented by Dean Contemporization and Accreditations on the short listing committee to be constituted by Trinity.

The hiring process is proposed to be completed this year.

The following areas have been shortlisted for the Thapar chairs to be established at Trinity.

Engineering

Sustainable Energy Systems: including energy efficient materials for engineering applications, energy modelling of buildings, lean construction, renewable and smart grid.

Advanced Manufacturing Engineering: Advanced robotics, additive processes for manufacturing, product development and design, process monitoring and instrumentation.

Communications and Media Processing: signal processing through audio, speech, video and communications processing to content, augmented reality and creative technologies; future networks.

Water and Sanitation: including decentralized sanitation, contaminant hydrology and hydrogeology, water resources, aquifer management, low energy/cost water and wastewater treatment.

SCSS

Smart and Sustainable Places: including Internet of Things, autonomous systems/services, multi-agent systems, adaptive systems, Intelligent Transportation Systems, smart grid/demand-side management, smart water management.

Educational Technology: personalisation, mobile learning, augmented reality, assessment technology and learning analytics.

Machine Learning for Data and Content Analytics: Machine and statistical learning algorithms applied to digital content (text, audio, image, video), focus on scalability and integration of methods for modelling, prediction and decision making.

Future Internet Architectures and Cloud Computing: Scalable, secure, protocols and architectures to allow energy-efficient delivery of computing services over a globally distributed infrastructure.

Curriculum Harmonization

- Curriculum of first two years discussed and harmonized with Trinity during March and June 2015 visits by Thapar staff.
- The course scheme and syllabus for years 3 & 4 discussed and agreed in October 2015.
- Developed and reviewed the course learning outcomes for the subjects for all years of study.
- The syllabi of all courses finalized and signed off by the respective departments.
- Senior design projects and individual research projects discussed and collected samples of projects that may be replicated. A list of all senior design projects during the last five years has been created.

Engineering Design Projects

- Thapar team joined the relevant TCD academic staff responsible for the Mangonel and Buggy projects and learnt everything hands on while it was conducted at Trinity.
- Developed and detailed the infrastructural and material requirement for various projects (Catapult, Buggy and others). This includes the lab space requirement for the projects.
- Documented the Standard Operating Procedure (SOP) for evaluation of the projects and also how learning outcomes for these projects are attained.
- Identified and developed more project themes that can be offered at TU in view of the larger intake of students.

Harmonization of schools

The schools at Thapar primarily offer only PG programs and also support the engineering departments in teaching of Maths, Science and humanities modules. The engineering departments have aligned their curriculum with Trinity School of Engineering and School of Computer Science. A similar activity has been initiated for the sciences and maths programs. At this time, the TU schools offer conventional M.Sc programs which are largely content driven and in order to modernize and enrich these programs, an academic review has been scheduled by Trinity staff.

Some of the steps that will be undertaken are as under:

- The schools of Physics, Chemistry and Maths underwent an academic review by Trinity. TU schools had submitted their self-assessment report to Trinity for the review process.
- TCD and TU jointly analyzed the findings of the review and submitted an action plan for implementing the findings of the review.
- TU will depute heads of the Schools to TCD for appropriate period for exposure and training for implementing the enrichment program for the mutually agreed period in 2016. The TU team will harmonize the curriculum of the PG programs.
- The schools will check the possibility of offering joint programs akin to engineering programs.
- External examiners in consultation with TCD will be introduced at TU.

PG Engineering Programs

In the first phase of implementation of the Contemporization Program, the UG programs were harmonized and aligned with Trinity. This was extended to include the PG programs offered by the four

engineering departments (Civil, Mechanical, Electronics & Computer Engineering). Further, the collaboration with Trinity has been expanded to promote research collaboration through a broad range of strategies, which include:

- Encourage joint research between institutions in the areas of technical knowledge by offering structured PhD programs in joint supervision mode.
- Identify opportunities for an articulation agreement (as with UG programs) for 2-year postgraduate engineering programs.
- Exchange, on a reciprocal basis, faculty and students for limited periods of time for the purpose of education and/or research for postgraduate or PhD programs.
- Exchange of knowledge, faculty and academic staff for short-term and, as funding and other circumstances permit, longer-term projects and visits.
- Joint applications for research funding to various Government and Non-Governmental organizations.
- Setting up of at least one state of the art Research Centre at TIET University over the next five years.

The two Thapar sponsored Professors at Trinity will spearhead all or some of these activities besides taking up research in thematic research areas. Such a partnership will result in setting up of a research centre at TIET University over the next five years.

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)

| All in practice |

2.9 No. of faculty members involved in curriculum
Restructuring/revision/syllabus development
    as member of Board of Study/Faculty/Curriculum Development workshop

| 65 | | |

2.10 Average percentage of attendance of students

| 75% min |

 2.11 Course/Programme wise distribution of pass percentage:

Title of the Programme	Total no. of students appeared	Division				
		Distinction %	I %	II %	III %	Pass %
2015 UG 1st Yr	1469	382	912	175		
2014UG-1st Yr	1207	255	738	214		
2013 UG-Ist Yr	994	166	473	237		
2012 UG-2nd Yr	955	159	502	280		
PG 2015 1st Yr	753	172	522	59		
2014 PG-1st Yr	647	121	471	55		
2013 PG-1st Yr	589	123	322	80		
2012 PG-2nd Yr	732	191	410	85		

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

The University has established, documented and implemented a Quality Management System. Continuous improvement in the implementation and effectiveness of the quality management system is

ensured through continuous reviews and internal audits. The University has identified the processes needed for the quality management system and their application throughout the organization process are being carried out in the University. Documented procedures have been developed for the management activities, provision of resources, instructional design, delivery and control and measurement.

PROCEDURE FOR MEASURING ATTAINMENT OF COURSE LEARNING OUTCOMES – DIRECT MEASURES

The assessment process used to measure attainment of CLO's is described as under:

The assessment process uses both direct and indirect measures to measure the attainment of each outcome. The examples of such measures are given below:

Direct Measures

- Student Assignments
- Projects
- Examinations

In-direct measures

- CLO Surveys

To assess each course, we use CLO's defined for that course. For example in Course A, we defined four CLO's (LO1 to LO4) that need to be met to successfully achieve that outcome at a minimum target performance level for a course. In each course, we assess the level of achievement of each course outcome. The data are then combined to analyze and evaluate the program level achievement of each program outcome. If any student outcomes are not met, action is taken for improvement.

In the section below, the assessment of course A using CLO 1 is explained as an example. For example, at the course level, CLO1 reads

- *CLO1: Applying scientific and/or engineering principles towards solving engineering problems.*

CLO Attainment Assessment Process

The step by step process for assessing CLO's is tabulated below.

Step-by-step process for assessing Student Outcomes

Step 1: The Program coordinator analyses each course by breaking down into course learning outcomes and weightage and rating scale has been defined for each course. In addition, well designed surveys were used to assess each outcome.
Step 2: For each outcome define performance indicators (Assessment criteria) and their targets.
Step 3: The module coordinators collects the qualitative and quantitative data and is used for outcome assessment in a continual process.
Step 4: The Program Assessment Committee analyzes the collected data. If the assessed data meets the targeted performance value specified in step 2, the outcome is attained.
Step 5: The Department Academic Affairs Committee recommends content delivery methods/course outcomes/ curriculum improvements as needed. In case the targeted

performance for some outcome is not met, a corrective action plan is put in place which serves as a feedback to the process for continuous improvement.

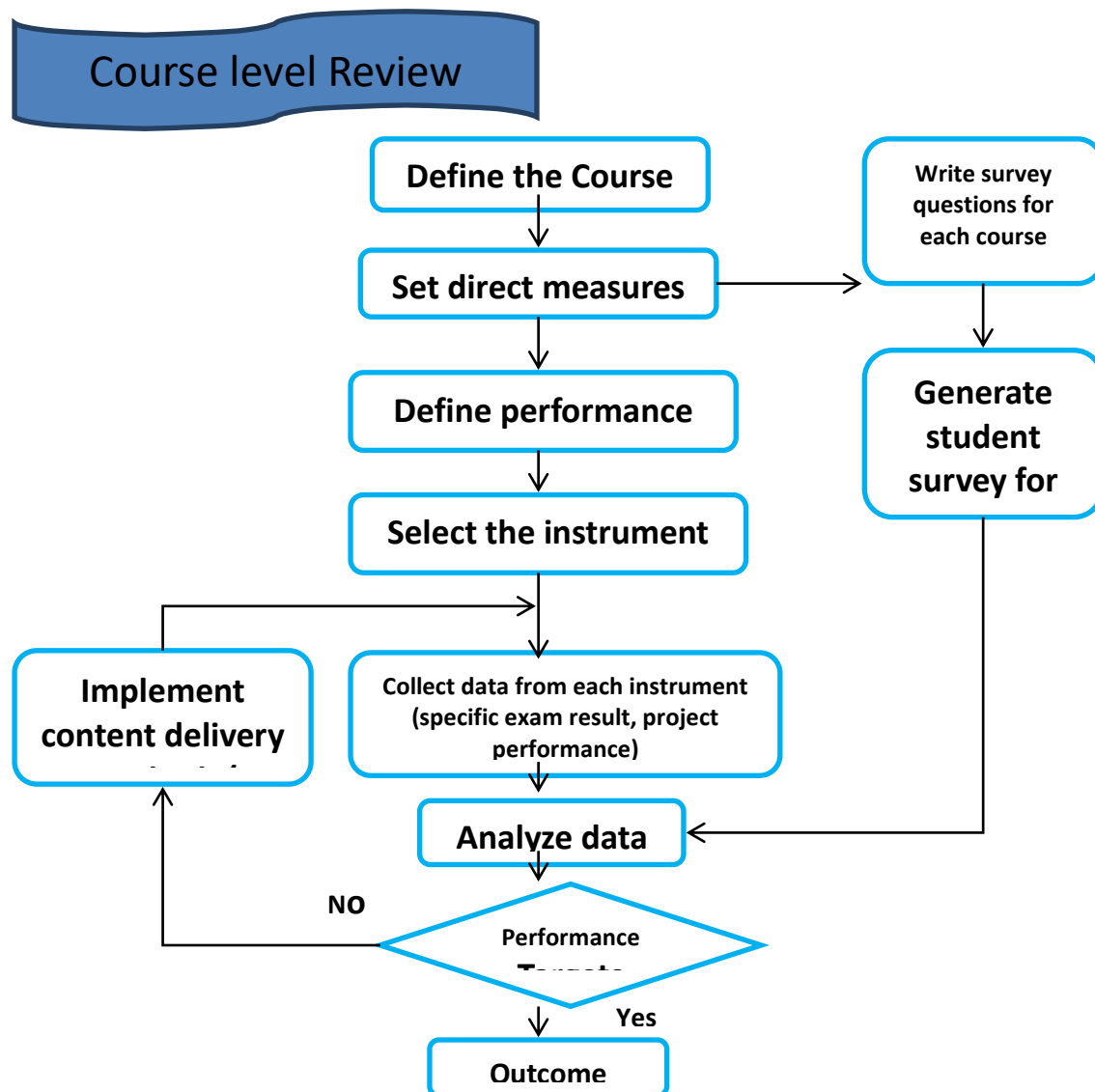The procedure followed at the course level is depicted in Figure 1 below:

Course level Review

```
┌─────────────────────┐          ┌──────────────────┐
│  Define the Course  │          │  Write survey    │
└─────────────────────┘          │  questions for   │
           │                     │  each course     │
           ▼                     └──────────────────┘
┌─────────────────────┐                   │
│  Set direct measures │──────────────▶   ▼
└─────────────────────┘          ┌──────────────────┐
           │                     │    Generate      │
           ▼                     │    student       │
┌─────────────────────┐          │   survey for     │
│ Define performance  │          └──────────────────┘
└─────────────────────┘                   │
           │                              │
           ▼                              │
┌─────────────────────┐                   │
│ Select the instrument│                  │
└─────────────────────┘                   │
           │                              │
 ┌─────────────────────┐ ┌────────────────────────────┐
 │   Implement         │ │ Collect data from each      │
 │ content delivery    │ │ instrument (specific exam   │
 │                     │ │ result, project performance)│
 └─────────────────────┘ └────────────────────────────┘
           │                      │              │
           │                      ▼              │
           │            ┌──────────────┐         │
           │            │ Analyze data │◀────────┘
           │            └──────────────┘
           │  NO               │
           │            ◆ Performance ◆
           └────────────   Targets
                              │      Yes
                              ▼
                       ┌──────────────┐
                       │   Outcome    │
                       └──────────────┘
```

Figure 1: Assessment of attainment of CLO's for a course

Assignment/Examination level

Throughout the semester, the course instructor uses specific questions in tutorial or assignments, laboratories or examinations directly related to course outcomes. For example: in case of **Computer Aided Design** questions specifically targeting CLO1 were asked in end semester examination (EST). The student performance in this question is then summarized. At the end of semester, the course instructor looks at the overall performance of each student across all instruments used for evaluating each performance criterion.

The step by step assessment process for assessing the attainment of outcome for measuring attainment in course A using CLO1 is explained as under:

Assessment of course 'A' using CLO1

a.) Assessment Tool: Student's performance using course file

Course: Computer Aided Design (UME 401)
From the course portfolio the instructor identified the following question (Question No.:1 asked in EST, weightage 30 marks) specifically targeting CLO1 for assessing student's competency in achieving course outcome 'CLO1'.

Question:

Model the cover part below. Use pattern for the four M22 holes. To balance the weight of the part, the $\varnothing 44$, 25 height pipe with the 110x R28, 10 height hydraulic joint connector above it is copied by translation to the left side of the part. Determine this translation distance.

The student performance in the above question is then analysed and the instructor scores the performance of each student using 1 to 5 rubric as shown in Table 1 below. Student's performance in the above question is given below:

Table 1: Student's performance in question targeting 'CLO1'; course: UME401

S. No.	Roll No.	Name	Marks (30)	Score (scale 1 to 5)
1.	101308083	PARAS	28	5
2.	101488012	MOHIT GOYAL	23	5
3.	101308102	SHREYAS BHAYANA	19	5
4.	101308098	SAMEER BHALLA	17	5
5.				
6.	*AND SO ON*			

The rating on a scale of 1 to 5 has been done using a rubric which gives a score of 5 to top performers and 1 to poor performers. Accordingly scale of 2, 3 and 4 can be used for those in the middle.

The overall performance of students in the above question is then summarized as given in Table 2 below.

Table 2: Average score of student performance in CLO 1 for course A

Course	% of students in each score					Average Score
	5	**4**	**3**	**2**	**1**	
CLO 1	27.59	18.97	24.14	15.52	13.79	3.3

After completing this assessment directly from the questions given to students using various instruments, we also use in-direct instruments which include student course survey to get to a final assessment score for each CLO. These scores for each CLO are then summarized to obtain the attainment level for each student outcome.

The assessment completed using the surveys for CLO 1 is also provided below:

Assessment Tool: Course survey

Table 3: Average score of student course survey for CLO1; course: UME401

Course	% of students in each score					Average Score
	5	**4**	**3**	**2**	**1**	
CLO 1	25	34.1	27.3	6.8	6.8	3.64

Step 3- **(a)** Weighted average from CLO's

There were three CLO's which were used to assess the attainment of course objectives for course A. The course instructor(s) then decide that each CLO contributes to attainment does so at a varying level. The faculty assigns weight on a scale of 1 to 5, describing how each CLO contributes to a particular course. Using these weights and scores from each CLO for the course, we compute the weighted average score for the CLO's using direct measurement. The sample calculation for evaluation of weighted average score of CLO 1 to CLO 3 using direct measurement is given in Table 4 below:

Table 4: Weighted Average Student class performance (course portfolio) for CLO 1 to CLO 3 for course A

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
CLO1	27.59	18.97	24.14	15.52	13.79	3.3	5
CLO2	30	38	20	6	5	3.81	5
CLO3	40	32.5	25	2.5	0	4.1	4
Weighted average score	32.00	29.63	22.91	8.40	7.88	3.71	14

(b) Weighted average from student course survey

Assessment Tool: Course Survey

Table 5: Weighted Average student course survey for CLO1 to CLO 3 for course A

Courses	% of students in each score					Average Score	Weight
	5	4	3	2	1		
CLO1	25	34.1	27.3	6.8	6.8	3.64	5
CLO2	28	59	10	0	3	4.09	5
CLO3	18	70	12	0	0	4.06	4
Weighted average score	24.07	53.25	16.75	2.43	3.50	3.92	14

Step-4: Overall weighted average score for CLO attainment for course A (for example CLO1 to CLO3 in this case)

The program faculty decided to assign weights to each assessment tool. Using these weights along with weighted average student class performance, weighted average student course survey score (from tables above) and the score, we computed the weighted average for each course and is given in Table 6.

Table 6: Overall weighted average score of course A

Assessment tools	% of students in each score					Average weighted score	Assessment tool Weight
	5	4	3	2	1		
Weighted average student class performance	32	29.63	22.91	8.4	7.88	3.71	5
Weighted average student course survey	24.07	53.25	16.75	2.43	3.5	3.92	4

Overall weighted score for A3 performance criteria is given by

$$Overall = \frac{[3.71 \times 6 + 3.92 \times 4]}{6 + 4} = 3.79$$

The overall score for attainment of CLO's in course A is thus 3.79 on a scale of 1 to 5.

2.13 Initiatives undertaken towards faculty development

Faculty / Staff Development Programmes	*Number of faculty benefitted*
Refresher courses	15
Faculty Improvement Programme (By NITTR)	20
Orientation programmes	32
Faculty exchange programme	15
Staff training conducted by the university	55
Others	1 (Int. Conf.) and 2 (National Conf.)

2.14 Details of Administrative and Technical staff

Category	Number of Employees	Number of Vacant Positions	Number of permanent positions filled during the Year
Administrative Staff	325	03	9
Technical Staff	170	02	03

Criterion – III

3. Research, Consultancy and Extension

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

The CONTEMPORIZATION PROGRAM is envisaged to deliver a research inspired; outcome based educational experience to the students. The partnership covers all the major academic and research activities of the University and will help address and bolster Thapar Institute of Engineering and Technology University's position as a leading centre for higher education in India and in the region. As a first step, we invited Trinity in November 2014 to conduct an academic review of our programs and governance procedures. The findings of the review set out a path to achieve a closing of the performance gap. An overall plan for change was then prepared for implementing the findings of the academic review. As a first step the harmonization of curriculum with Trinity was taken up to bring it up to date with global standards. We have adopted the learning outcomes approach for teaching with greater reliance on self-directed learning, projects and research-led teaching.

To give a major fillip to research, we have sponsored two research professorships at Trinity. The Professors would spend time both at Thapar and Trinity and would lead a major research effort which will culminate into setting up of a State of the Art research centre at Thapar in the next five years.

As part of the contemporisation program, we are also setting up a Centre for Academic Practice and Student Learning under mentorship of Trinity to support and help the faculty hone their skills and teaching pedagogy. This centre will support a whole-institutional approach to teaching and learning and facilitate a broad adoption of this new learning paradigm. The training and on-going professional development will be instrumental in establishing the culture necessary for this initiative to grow and contribute meaningfully to the contemporisation programme.

We have envisioned improving the laboratory and physical infrastructure on the campus. A modernization plan for the important teaching and research laboratories in consultation with Trinity has been developed. We have hired world class foreign architects to develop key academic infrastructure that would include new Computer Science block, Library, Lecture hall complex, student residences and other academic blocks. Face lifting and modernization of older buildings has also been planned in a major way. Thapar Institute of Engineering and Technology University has also planned to implement an international ERP system to manage and govern the academic, financial and administrative functions.

We have undertaken major examination reforms during the year. In the new procedure, the question papers are now being reviewed by Trinity. The examination results will be discussed by an Examination Board which will be convened to review sample answer scripts, projects and the marks obtained by the students.

The partnership is now being expanded to collaborate in other areas of academia and research which includes the programs offered by TIET University Schools of Mathematics, Physics, Chemistry and the postgraduate and PhD programs. Additional academic areas in Arts, Humanities and Social Sciences are also being scoped.

An Innovation Centre/Venture Lab would be set up at TIET University to run accelerator program open to teams of students with an early-stage business idea. The program will support students in developing investor-ready ventures.

Thapar Institute of Engineering and Technology University constituted the "Senate Research Committee" to discuss all the matters pertaining to policies of Ph.D. programmes and other research parameters like consultancy, testing and IPR cell.

For each Ph.D. student a specific doctoral committee is there consisting of supervisors, members from the cognate area from the candidate's department and outside the department & chaired by the respective head of the department/school. The doctoral committee monitors the progress of the candidate from time to time and specifically once in every semester through a formal presentation of work done during previous six months. The Dean, R&SP communicates to all departments/schools for research facilities and funding available by various sponsoring agencies from time to time. The progress record of research projects is maintained by the DoRSP office.

The Doctoral Committee constitutes of Head of Department/Schools as Chairperson, Supervisor (s) and two other Senior Faculty in the area of expertise as members. Each candidate has to make power point presentation of the progress before the Doctoral Committee and presentations are organized by the office of Dean (Research & Sponsored projects).

Regarding monitoring of research projects, a statutory body of the University i.e., Planning and Monitoring Board under the Chairmanship of the Director and other senior faculty being its members monitor progress of each project, the minutes of which are circulated. The meeting of Planning and Monitoring Board are held at regular intervals at least twice in a year.

Dean, R&SP convenes the meeting of all Heads of Departments/Schools in every semester to decide on the admissions to Ph.D. programme of the University.

The university proactively promotes participation of all faculty members as Principal Investigator for various sponsored projects/schemes and provides all the necessary and provides all the necessary support and basic facilities as well as to advance the funds as support to ensure smooth completion of the projects.

There are several joint research activities like Ph.D. supervision between various departments. There has been lot of synergy between some departments such as Mechanical Engineering with Chemical and Civil Engineering, Chemical Engineering and Biotechnology, Civil and Environmental Engineering, Computer Science and Mathematics, Behavioural Sciences with Management, Industrial Engineering with Management and many others. Many sponsored research projects are being guided jointly by faculty of two different departments.

MOU's with other Institutions are also operational which facilitate joint research activity. Many faculty members from different IIT's are acting as supervisors of the PhD students registered at Thapar Institute of Engineering and Technology University.

The details of such joint collaborative projects and joint PhD supervision are placed with Departmental/ School's profile submitted separately.

3.2   Details regarding major projects (**from agencies other than Thapar Institute of Engineering and Technology University**)

	Completed	Ongoing	Sanctioned	Submitted
Number	29	118	22	---
Outlay in Rs. Lakhs	414.80	3046.70	1041.67	---

3.3   Details regarding minor projects

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

3.4   Details on research publications

	International	National	Others
Peer Review Journals (Scopus)	582		
Non-Peer Review Journals	139		
e-Journals	All published papers are available online.		
Conference proceedings	174	50	

3.5 Details on Impact factor of publications:

Range [0-12.9]   Average [1.64]   h-index [43]   Nos. in SCOPUS [582]
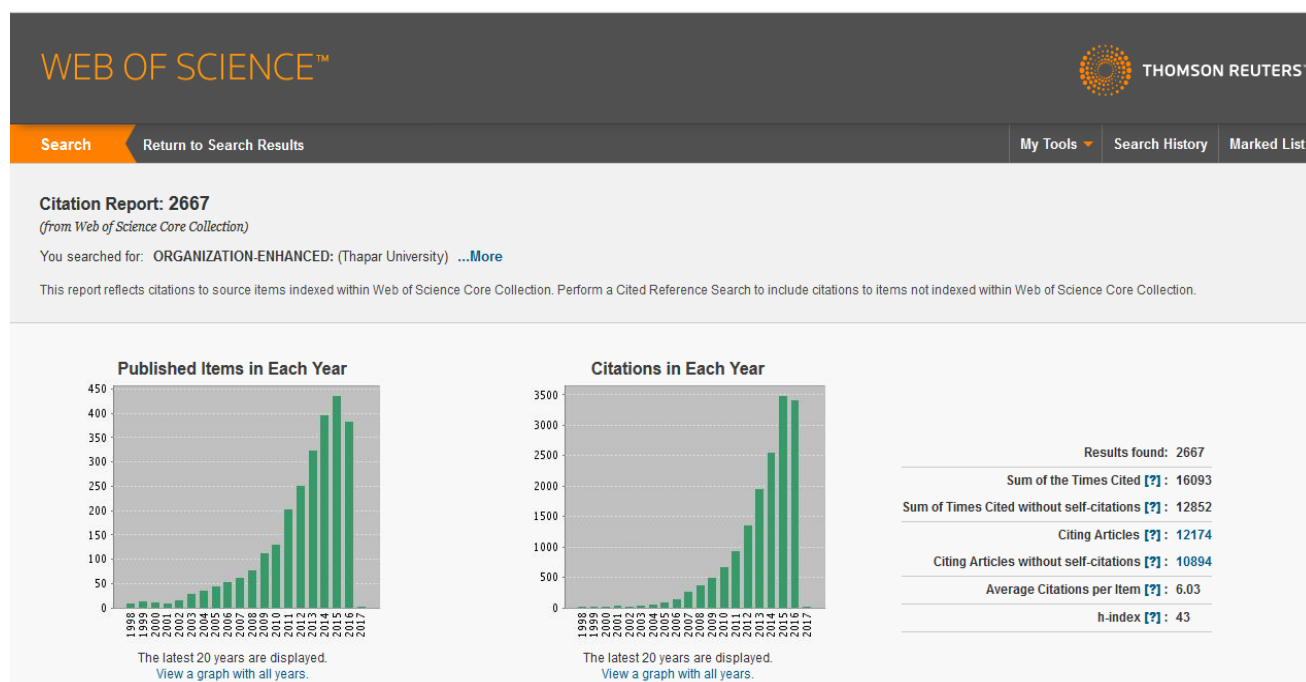
3.6 Research funds sanctioned and received from various funding agencies, industry and other organisations

Nature of the Project	Duration Year	Name of the funding Agency	Total grant sanctioned	Projects Received
Major projects	2015-16	CSIR, DBT, DRDO, DST, UGC, etc	Rs. 1041.67 lakhs	22
Minor Projects	2015-16		nil	nil

Interdisciplinary Projects	2015-16	--	--	---
Industry sponsored	2015-16	Industries	Rs. 58.1 Lakhs	31
Projects sponsored by the University/ College	2015-16	Thapar Institute of Engineering and Technology University	Rs. 50 Lakhs	11
Students research projects *(other than compulsory by the University)*	2015-16	---		
Any other(Specify)	2015-16	---		
Total			1148.77 Lakhs	64

3.7 No. of books published   i) With ISBN No.   `25`   Chapters in Edited Books   `4`

(3-current data)

ii) Without ISBN No.   `-`

3.8 No. of University Departments receiving funds from

UGC-SAP `2`   CAS `  `   DST-FIST `3`

DPE `  `   DBT Scheme/funds `4`

UGC-BSR- 4

UGC – 24

UGC/DAE- 1

3.9 For colleges   Autonomy   CPE   DBT Star Scheme

INSPIRE `  `   CE `  `   Any Other (specify) `  `

3.10 Revenue generated through consultancy   `58.26 Lakhs (2015-16)`

3.11 No. of conferences organized by the Institution

Level	International	National	State	University	College
Number	1	2			
Sponsoring agencies	AICTE, DST, TEQIP-II, UGC				

3.12 No. of faculty served as experts, chairpersons or resource persons   `60`

3.13 No. of collaborations   International `19`   National `11`   Any other `20`

3.14 No. of linkages created during this year   `3`

3.15 Total budget for research for current year in lakhs:

From funding agency | Rs. 5.82 Cr | From Management of University/College | Rs. 4.4 Cr.

Total | Rs. 10.22 Cr

3.16 No. of patents received this year

Type of Patent		Number
National	Applied	6
	Granted	Nil
International	Applied	Nil
	Granted	Nil
Commercialised	Applied	Nil
	Granted	Nil

3.17 No. of research awards/ recognitions received by faculty and research fellows of the institute in the year

Total	International	National	State	University	Dist	College
66	10	2	4	50	----	----

3.18 No. of faculty from the Institution who are Ph. D. Guides and students registered under them

245

650

3.19 No. of Ph.D. awarded by faculty from the Institution

56

3.20 No. of Research scholars receiving the Fellowships (Newly enrolled + existing ones):

JRF | 51 | SRF | 17 | Project Fellows | 29 | Any other: **TA** | 129

3.21 No. of students Participated in NSS events:

University level | 965 | State level

National level | International level

3.22 No. of students participated in NCC events: **Nil**

University level | State level

National level | International level

3.23 No. of Awards won in NSS**:**   **Nil**

University level ☐   State level ☐

National level ☐   International level ☐

3.24 No. of Awards won in NCC: **Nil**

University level ☐   State level ☐

National level   International level ☐   ☐

3.25 No. of Extension activities organized

University forum	15	College forum	---		
NCC	---	NSS	11	Any other	55

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

STUDENT ACTIVITIES

NATIONAL & INTERNATIONAL ACTIVITIESS FOR THE YEAR 2015-16

SATURNALIA 2015 ORIENTATION

On August 13, at 5.00 pm, all the students gathered in the university auditorium where they were introduced to Saturnalia – the techno cultural fest. The orientation got a tightly packed response as all the students especially the freshmen students were excited to know about this mega fest. Dean of Student Affairs, Dr. Maneek Kumar also witnessed this event along with the other dignitaries. All in all, it was an amazing evening which surely generated keen interest amongst the students for Saturnalia, especially with the young freshmen students, who were going to be a part of such a mega event for the first time.

The various activities and competitions organized under the event Saturnalia 2015 included the following:

CSR ACTIVITIES:-

- **Independence Day was celebrated by the** students of TIET University on August 15, 2015. It was celebrated in collaboration with NSS. A tree plantation drive was carried out supported by team Saturnalia. Honourable dignitaries Dr. Prakash Gopalan (Director) and Dr. Maneek Kumar (DoSA) along with the association of various societies participated in the event.

- Students and teachers of the university came together at COS complex at 7 pm to pay homage to the beloved president of India Dr. APJ Abdul Kalam by lighting candles and writing messages on cards remembering the iconic leader. This gathering was highlighted in media.

- **Graffiti** event with the theme of tree plantation took place on the main entrance of TIET University on 7th September. The graffiti were prepared by team saturnalia within three days with the help of 'Paryavaran Welfare Society' and 'Avinash Gadget Art Group'. It was carried out in association with 'Dainik Bhaskar group' who also covered the whole event. The event was a success and kept up with the expectation of all people.

- **Marathon** was organised by Saturnalia team in association with Blaser Swiss Blue which started from TIET University with its destination being Amar Hospital. Captain Manjeet Singh, the administrative officer of TIET University led the marathon. More than 50 students of TIET University took part in the marathon.

Workshops on Amazon Cloud Services: -Saturnalia team organised workshops on Amazon Cloud Services for the students. The workshops were aimed at improving the students' technical skills in the field of cloud computing which is the demand of the future. Mr. Rahul Tyagi, an ethical hacker, born and brought up in Ludhiana and who has worked for various MNCs including Google and Microsoft in improving the security of their systems and networks, gave the students a talk and workshop on computer security and ethical hacking. The workshop was attended by more than 200 students.

TECHNICAL COMPETITIONS:-

- Hackathon was a 24-hour long coding competition where more than 33 teams took part including teams from IIT Varanasi and NSIT Delhi. This event was presented by Cube 26 which gave away cash prize of Rs.1.00 lakhs for this event.
- Robo Wars was a key event from ECE in Saturnalia. Teams from Chitkara University, PEC, and Chandigarh University etc. came to take part in this event. This was won by the team led by Shubham Garg and Shubham Singh from Thapar University.
- **CODE JAM** is a yearly international coding event organized by Google to identify talented people for employment at Google. The winners of this competition were awarded hacker earth merchandise as well as Flipkart vouchers worth Rs.8000.

I)   URJA 2016: SPORTS FESTIVAL4th – 6thMarch 2016

URJA, the second edition of the national level sports festival of TIET University in which more than 20 institutes from all over the country participated, was held from March 4th -6th March 2016. URJA, Annual Sports Fest of Thapar University, Patiala was organized by the TIET University Sports Association during 4th-6th March 2016. Fostering Thapar University's name at the National Level in Sports became the impetus for this National Level Sports Extravaganza of TIET University "URJA 2016"
URJA focuses on providing a platform for students from all over India to showcase their talent and compete with the best upcoming sportspersons in the country in a competitive aura.
The fest comprised of a plethora of events from Stunt Shows and Live Streaming of Matches to various sports events like Athletics, Cricket, Football, Volleyball, Basketball, Badminton, Lawn Tennis, Table Tennis, Chess and Marathon races.

Participating Institutes: Different teams from all over Northern India made their way to participate in URJA, 2016. Some of the prominent participant included teams from Punjab Engineering College, Chandigarh; Chitkara University, Baddi and Rajpura; NIT, Kurukshetra ; NIT, Jalandhar; University College of Engineering (UCOE),Punjabi University, Patiala; Maharshi Dayanand University, Rohtak; Maharshi Markandeshwar University, Mullana; LPU, Jalandhar; NSIT, Delhi; SLIET, Longowal; ITM, Gurgaon; ACIET, Amritsar;IMS, Ghaziabad. The sportspersons that came from diverse regions were well taken care of. Accommodation facilities were made in the hostels of ThaparUniversity. Apart from all this, few fun activities such as DJ and Water Zorbing were also organized.

MICROSOFT STUDENT CHAPTER

In coordination with Mr. Vinay Arora (President, Microsoft Student Chapter), Mr. Raj Kumar Tekchandani (Vice President, Microsoft Student Chapter) and Mr. Gursimranjit Singh (General secretary, Microsoft Student Chapter), a series of events has been conducted from 23-24 February 2016, with name *"Rumble 2K16"* that comprised technical and non-technical events.

T20 World Cup Quiz

With a more than 200+ participants this event was conducted on 23rd February, 2016 in Tan Audi. In this event the questions related to the world cup history were asked from students.

Cloud Computing (workshop) – Mr. Rahul (the resource person from NIIT, Chandigarh) had conducted a workshop on 24th February 2016 where, the student was provided an orientation related to the basic concepts of the cloud computing as well as Hadoop technology. In this more approx. 150+ interested students had participated.

Code Rumble: - For testing the skills related to the logic building, pattern analysis, and code deciphering, the event named Code Rumble has been organized at HackerRank. On 24th February 2016, approx. 200+ students have signed up and participated in this coding event. *"MSWEEK 2K15"* encompassed various technical and non-technical events, which were organized from *14th - 28th October 2015.*

Detail related to the events as shown in the MSWeek 2K15 calendar is as mentioned below:

Online Money Making (Workshop):- This workshop was been organized by Mr. Parwinder Singh (Student from 3rd Yr CSE) from 5 PM to 6PM on 14th Oct 2015. More than 200 students had attended this event. Parwinder has provided a good insight on the sectors which can be tapped by a student where he/she can earn money while utilizing his/her free time. Current technologies were discussed and explored up-to a satisfactory depth to make the students comfortable with the idea. Idea related to the freelancing and utilization of YouTube, Search Engine Optimization techniques were discussed. Students appreciated this event and demanded for another program on the same grounds.

Placement Talk:-This event was exclusively demanded by the students from 2nd as well as 3rd Yr. who are proactively planning for their placements. Talk was delivered by already placed student of final year (2016 batch) of our university. Most of the speakers have been placed in dream companies like Microsoft, ZS Associates, Informatica, and Freescale, etc. More than 220 students have attended this event and organizers have got the excellent appreciation from the attendees. Event was conducted on 14th October 2015.

Brain Wizard (Quiz based on core mathematics and aptitude)

With a more than 100 participants this event was conducted on 15th October 2015 at T -105, where questions covering the basic concepts of mathematics and some specialized puzzles were asked and students appreciated as they need to process it in their CPUs.

"Can U C" (Quiz based on C programming)

Here, the knowledge of basic programming language has been tested and the concepts asked were really simple but with a little bit flavours related to placements. This was conducted on 26th Oct 2015 in T-105. Student participation has crossed a count of 100 and

Data mining & machine learning (workshop) - Dr. Prashant Singh Rana (Assistant Professor, CSED, TU) has organized a workshop on 15th Feb 2015 where, the students were taught the basic concepts of the data mining and machine learning. More than 150 interested students attended and got benefited with the knowledge of Dr. Rana.

Workshop on WhatsApp Hacking: - This workshop was headed by Mr. OOPPSS (real name not revealed) (Ex-CBI Officer / Sr. Security analyst i3Indya). With a crowd of more than 150 students, Ex-CBI officer had shared the tricks and knowledge of WhatsApp hacking in TAN Audi on 27th October 2015 from 9AM to 5PM. This event was a great success and students admired the skilful person as well as the event organizers. Students have also placed a demand for conducting such workshops frequently.

Code for geeks: - The event has tested the skills related to the logic building, pattern analysis, and code deciphering. This event has been conducted online through Hacker Rank on 28th October 2015, in which a crowd of more than 200 students has signed up and participated in this coding event.

NATIONAL SERVICE SCHEME (NSS)

Objective: One-day camp was organized to create interest among the B.E. first year students during the frosh week. Trees were planted along the road leading to hostel PG, near old polytechnic building and on the divider of the road leading to FRA & FRB. Total 85 trees were planted as per the following details.

TREE PLANTATION PROGRAMME BY NSS UNITS OF THAPAR UNIVERSITY, PATIALA

The National Service Scheme (NSS) Unit-13 of Thapar University, Patiala, organized a Tree Plantation programme for the development of green-clean environment, in the university premises on August 15, 2015 from 08:30 a.m. The jubilant NSS candidates identified appropriate place for plantation, prepared the saplings and accomplished the job with professional-like skill. They also committed themselves to nourish and maintain the allocated plant. Nearly thirty NSS student members and programme officers of several other NSS units of TU took part to make the programme successful.

AUDIO VISUAL QUIZ COMPETITIONELECTRONICS & COMMUNICATION ENGINEERING DEPARTMENT

NSS Unit 8 & 9 of TIET University organized an Audio Visual Quiz Competition on 25th August, 2015 at 5:30 pm in Room no F108 in the presence of Mrs. Manu Bansal Program Officer of NSS unit. The quiz was organized with objective to pay Tribute to former President Late Dr. APJ Abdul Kalam and to check knowledge of students about INDIA's Past. The event was successfully organized by Chirag Saluja and Guntaas Singh, Convener and Co-Convener of the society respectively. A team of two members was made and in total 11 teams were there. The top 2 teams were selected and were awarded after passing through various rounds. The quiz was taken by Abhishek Jain, member of NSS.

SPECIAL CAMP CARE AND SHARE SEPTEMBER 7-13, 2015

More than 50 volunteers of the unit participated in the special camp organized at village Behra which houses the LM Thapar School of Management in the Derabassi campus of Thapar University. The day-wise proceedings are captured below.

Day 1 Sep 7: Tree Plantation Drive: The volunteers did a wonderful job of planting trees around 26 Dek trees from the neem family.

Day 2 Sep 8: Tree Plantation Drive and Maintenance: On the second day, volunteers of NSS did a great job of planting 24 more trees of the same variety. They also undertook maintenance and watering activities.

Day 4 Sep 10:Visit to Labour Colony in **Behra Village:** The volunteers donated biscuits, clothes, footwear and other eatables to around 30- 35 labourers, both men and women, with love and affection.

Day 5 Sep 11: Temple in Behra village

The volunteers first swept the temple and then donated winter caps, biscuits, toys, clothes, footwear and other items to around 30-40 little children and women in the Behra Mandir.

Mega Blood Donation Camp at Thapar University, 393 units of blood donors donated blood.
The National Service Scheme (NSS) Unit I&II organized a blood donation camp and sponsorship was provided by state bank of Patiala (SBOP) as well as CLICK. The camp was organized at Auditorium TIET Universityon 20 October, 2015. Number of donors who donated the blood was 74 and list of donors is attached to the email. NSS special camp = 3. Blood donation camp =4   Total Donors = 393, sapling plants   =361

II) PRATIGYA SOCIETY

Pratigya is a movement started in 2005, aiming for all round development of underprivileged children. It is a team that basically teaches underprivileged kids from classes 1st to 12th and diploma students. The volunteers are the students of TIET University from B.E. all years as well as MSc, M Tech and MBA. Proper time-table is maintained for the process and regular attendance is taken and tests are conducted. All process and workings are supervised by our faculty advisors viz. Dr. Anoop Verma and Dr. Prateek Bhatia.

REGULAR CLASSES

Giving education is our top priority and we try our best to help kids of Pratigya society in every way possible. Regular classes are held in E-Block (first floor) from Monday to Friday from 5:10pm to 6:15pm. On an average 150 kids from various backgrounds come to us for studying and we try our best to provide as much knowledge to them as possible. Regular tests are conducted and test results are further analysed to know weak points of students and appropriate efforts are made for improvement of the student's performance.

SPORTS DAY

Pratigya society organised its sports day on 11th October, 2015 for the students. More than 150 students participated in a daylong event starting at 8:00am to 2:00 pm. The day witnessed an active participation from all the children and great enthusiasm by the organising volunteers.

Different sports competition like racing, football, basketball, volleyball, cricket, badminton, kho-kho, self-defence etc. were held.

PARYAVARAN WELFARE SOCIETY:
Tree Plantation Drives: Rapid constructions and mushrooming of housing colonies have led to the depletion of green cover in many parts of our country. The importance of trees in purifying the air, reducing global warming, preventing soil erosion, conservation of water, maintaining the ecological balance, providing natural resources as medicines, habitats for faunal species, providing nutrients to the soil etc. is well known. Unfortunately, the overall green cover, not just in Patiala but in other parts of the country is also reducing and as a consequence of this, pollution is increasing at an alarming rate.

During the July to September 2014, PWS carried out tree plantation drives at different locations **within the TIET University** and nearby areas of district Patiala like **Central divider Sirhind road**, **Central divider Rajpura road** and **Power house colony**.

SOCIETY FOR PROMOTION OF INDIAN CLASSICAL MUSIC & CULTURE AMONGST YOUTH (SPICMACAY)

The SPICMACAY night was hosted by SPICMACAY society of TIET University on 5 November 2015 at 6:40 p.m. in auditorium. It was overwhelming to see an odissi dancer Ms. Kavita Dwibediji performing her talent on stage. Kavita Dwivediji had showcased her talent in 42 countries. She not only performed but also gave us tremendous knowledge about odissi dance and culture. She was welcomed with a bouquet by Dr. Maneek Kumar and Dr. Rajesh Khanna and then at the end was presented memento by our Director Dr. Prakash Gopalan along with his wife.

ShaamMastani

Event started with the performance of Manisha who sang a classical song and then Mujtaba Hussain played his flute and mesmerized the crowd...and the event ended with the melodious voice of Prof. Pyarelal. Guest of honor was Dr. Gurpratap Singh....who is a former HOD music at Punjabi University.

Ibaadat -e- Qawwali

SPICMACAYsociety hosted different events this year in which Ibaadat -e- Qawwali night was organized on 8 March , 2016 from 6:15 pm to 8:30 pm in auditorium. The main attraction of the event was HasnainNizami who is a Qawwal in DargahHazratNizamuddinAulia and he is a grandson of Tanras Khan who was a Darbari singer of Bahadur Shah Zafar.

'SANGAM' on 9 March 2016

Another event of SPICMACAY took place which was an international event called 'SANGAM' on 9 March 2016 from 6:30 p.m. onwards in auditorium. Artist from around the world came to showcase their talents and perform on stage. There was lamp lightening ceremony by Dr. Maneek Kumar and Director Dr. Prakash Gopalan. The director of the event was MujtabaHussain who well-coordinated with all the performers. It was a blend of eastern and western culture and it was amazing to witness the world in Indian colours. Some of the artist who came were Mahuya Mukherjee, an exponent of khayal and thumri style of Hindustan music. She has been awarded lot many awards and has a great experience. Another artist was Nastya who is born in Russia, and graduated as a violinist in 2001 and worked in St.Petersberg conservatory as a methodical specialist. The overall event coordinators were TusharSingla and Madhur Mittal.

TIET UNIVERSITY, PATIALA (SWACHH BHARAT ABHIYAAN REPORT)
Swachh Bharat Abhiyaan, Paryavaran Welfare Society, TIET University

Report up to 31th January 2016, the initiative covered following places with regard to Swachh Bharat Abhiyaan, under the banner of Paryavaran Welfare Society, Thapar University, Patiala.

- Cleaning of outskirts of excise and taxation office
- Painting of Traffic Police Standing Booth
- Cleaning and painting drive alongside Central Jail Road

Cleaning of outskirts of excise and taxation office: To make Bhupindra road fully clean, we have carried out 3 days extensive cleaning campaign alongside outskirts of excise and taxation office. During this campaign we have used brush cutter machine to remove weeds and grass. After cleaning we have shifted the dump from this location to official dumping ground of Municipal Corporation, Patiala.

Painting of Traffic Police Booth:

Apparently, everybody wants the world to be a better place to live in but there are few who actually step out to make the difference. It does not require any super-human efforts if everyone realize their part towards Mother Earth and not merely castigate the system refraining from responsibilities. We, at PWS don't believe in war of words but in doing what is necessary to make Patiala a clean and green city making it potent enough for the name it is known since its formation, "Patiala-The City of gardens"

To make chowk near TIET University look clean, we have done painting of traffic police standing booth with the financial support from Thapar University.

Cleaning and painting of central jail road:

To make outskirts of Bhadson Chungi Road and TIET University Clean and green we have done tree

Inauguration of painting of central jail road wall by Sh. K.S. Jatana and Sh. Rakesh Sharma

Painting of central jail Road wall by Andeman and Nacobar/Punjab jail training students

plantation drives and extensive cleaning campaigns in these areas. Under this cleaning campaign we have done painting and cleaning of Central Jail Road Wall in collaboration with Punjab jail Training School, Patiala. The chief guests for this event were Karamjit Singh Jatana (Ex. DFO, Patiala), and Rakesh Sharma (Vice Principal, Punjab jail training school, Patiala). Rakesh Sharma from PJTS had given full support to our organization to carry out painting of wall by providing PJTS Andeman and Nacobar/Punjab students. Students and members of our PWS team also participated in this city cleaning

1) **TeamUltron Sports** had participated in Mega ATV Championship 2016, held from **4th-8th March 2016** and secured an **overall rank of 35**. It is an off-terrain ATV (All-Terrain Vehicle) / Dune Buggy / Mini BAJA racing competition based on Real life challenges and disaster management using All-Terrain Vehicle (ATV's). The event is being organized by Autosports India, in association with Kalinga Motorsports Club, supported by Ministry of Sports, Govt. of Odisha, FIA and FMSCI (Federation of Motorsports Club of India).

2) **Team FATEH,** TIET University had participated in the international event **Formula student UK 2015**, held from **8th July to 12th July 2015**. The event was held at Silverstone Circuit, Northampton shire, London, UK. The team secured the **overall rank of 63rd out of 97 qualified team**. Team Fateh is an idea that took birth 8 years ago in Thapar University, Patiala. It comprises of dynamic young engineers of the university, who share the ambition of taking India to the top 20 Best Formula SAE teams in the world. The team has members from disciplines ranging from Mechanical engineering, Mechatronics engineering to Electronics engineering.

3) **Team GRENADIERS** had participated in a ROBOWARs competition of the tech fest "COGNIZANCE", organized by IIT Roorkee, held from March 27 to March 29, 2015.

4) A team from **Robotic Society** had participated in an event "**Techkriti**", held on 19th-22nd March 2015, at IIT Kanpur

5) **Team Road Runners** had participated in **Elite Karting 2015/EK-14** Competition, which was held on RPM Racing Circuit, Bhopal, Madhya Pradesh from **25th February 2015 to 28th February 2015.** This event was organized by Elite Techno Groups in association with F1 Racing Marshalls. This is a national go-kart designing and fabrication competition with students participating from all over our country. The team "**Road Runners**" was formed by the students of 2nd Year Mechanical Engineering, TIET University to take part. Team "**Road Runners**" had successfully showcased their design and performance in the Event and **secured the overall rank of 16th in INDIA out of 133 participating teams.**

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	270 Acres + 26.29 Acres (Derabassi Campus)	NIL		Fees , Income from Research & Consultancy projects, Executive Development Programmes	296.29 acres
Class rooms	108 (9027.00Sq. mts)	28 **3702.74 sqm under construction**		Fees , Income	136
Laboratories	105	35 **2625.90 sqm (under construction**		Fees	140
Seminar Halls	7	3 **493.74 sqm (under construction**		Fees	10
No. of important equipments purchased (≥ 1-0 lakh) during the current year.	477			Fees	477
Value of the equipment purchased during the year (Rs. in Lakhs)	Rs 464.27 Lakhs			Fee income + Research Grant	Rs 464.27
Others: (Expenditure on enhancing computer networks and infrastructures)		Rs. **164.310 Lakhs**			Rs. **164.310 Lakhs**

4.2 Computerization of administration and library

Thapar Institute of Engineering and Technology University, Patiala is in the process of implementing e-solutions software for its academic and other related activities including human resource management

and financial management. Academic activities, such as, conduct of mid semester test and end semester examination, central repository of marks and grades of the students, assigning the grades to the students by faculty members and students reaction survey have been implemented using this software. Online facility for registration information, date-sheet, seating plan and duty chart has been provided to all the concerned through Web-Kiosk. On-line quizzes have been started for core courses. Computerized DMCs of students are sent to the parents.

4.3 Library services:

	2014-2015						2015-2016					
	Existing		Newly added		Total		Existing		Newly added		Total	
	No.	Value	No.	No.	Value	No.	No.	Value	No.	Value	No.	Value
Text Books	79652		8891	79652	36.96 Lakhs	8891	88543		2898	31.06 Lakhs	91441	
Reference Books												
e-Books	1779		405	1779		405	2184		184	1.60	2301	
Journals (Print)			78	73.8 Lakhs		78	78		48	76.97Lakhs	48	
e-Journals			6538			6538	6538		2533		8891	
Digital Database	12					12	12		1	13.50	13	
CD & Video							3000+				3000+	
Others (specify) Magzines							22				22	
Standards	4284		--	4284		--	4284		--		4284	
Print Thesis	2474		65	2474		65	2539		69		2608	
Bound Journals							4973		172		5145	

4.4 Technology up gradation (overall)

	Total Computers	Computer Labs	Internet	Browsing Centres	Computer Centres	Office	Depart-ments	Others
Existing	1050	12	1024+310 =1334 Mbps	Wifi and wired computer network facility is available all around campus including academic area, hostels, faculty residence, cafeterias and all labs	2 dedicated computer centres	258	15	---
Added	350	6	775 Mbps		----	Faculty can purchse computers from faculty developments funds from University	----	----
Total	1400	16	2109 Mbps		2	258+	15	----

Internet access is available in all Offices/Labs/Academic Blocks/Library/Hostels/Residences

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

The following facilities are added:

Computing:

- Computer: 350 Computers are added for 6 labs.
- Citrix Xen Server is added for Institute's Private Cloud Server.
- MATHWORKS Campus Agreement for Faculty/Staff/Students for unlimited licenses for all toolbox of MATLAB and MATHWORKS.
- Microsoft Campus agreement for Desktop OS Licensing/ office for faculty and staff and Microsoft DreamSpark for Software Development Tools for Students and faculty.

Internet Access:

- In 2016, Institute has upgraded the bandwidth of Internet Leased Line from 310 Mbps to 1085 Mbps. Now, Institute has aggregate bandwidth 1085 + 1024 Mbps = 2109 Mbps.
- Institute has 10098 users created for Internet access of students/staff/faculty/researchers, in which 4500 concurrent active users accessing Internet form academic area/ hostels and residence.

The following bandwidth policy are applied

- Students: Download 2.8 Mbps and Upload 1 Mbps
- Faculty/Staff/Researchers: Download 4 Mbps and Upload 1 Mbps
- Institute has upgraded the UTM/Firewall to cater the increased internet load for users.

Training to teachers and students:

- Organized three days hands on training on MATLAB FUNDAMENTALS 17-19 March, 2016
- Organized one-day workshop on Parallel Computing, Signal Processing, Image Processing and video processing and Advanced Communications System Design with Simulink tool box of MATLAB on 20th April, 2016.

Networking:

- LAN/WLAN deployed in boys Hostel K of 600 capacity.
- LAN/WLAN deployed in boys Hostel L of 300 capacity.
- Fiber Distribution centre in Hostel H to provide connectivity to all upcoming buildings.
- LAN deployment in G-Block Building.

E-Governance: Institute has ERP and following Upgradation are done

- Generating e-invoice and sending emails/sms and reminders to students
- Automatic generation and incorporation of fine in the system
- Audit trail maintenance of logs in the Database
- Printing degree/ final semester grade sheet/ transcript by the software
- Allotment of budget multiple times for a given head
- Automatic generation of employee id
- Data entry by students in the software after fee is deposited and to integrate with bank for SMS
- Hostel Management module.
- Webkiosk intranet was upgraded to tomcat version 7.0.56

Other:

The institute is registered with QEEE program of MHRD for Quality Enhancement in Engineering Education. In Jan-April, 2016performance assessment of this program, the institute rated in top category i.e. "Partner" level.

Centre of Information and Technology Management (CITM) has been established in the University after integrating three units, namely, Computer Centre, Centre for Information Super-Highway and University Science Instrumentation Centre. This centre has been established to cater the needs of users involving implementation, maintenance and support activities related to software and hardware; procurement, support and maintenance of various equipments of users.

CITM also provides repair and maintenance of Electronic Instruments/Equipment and, PCs and peripherals used in various Laboratories. This centre is contributing in the implementation of ERP

software that includes modules financial management, inventory management, human resource management, purchase management, academic activities etc. and its related support to the users of Thapar Institute of Engineering and Technology University. CITM is also responsible for maintenance and administration of Thapar Institute of Engineering and Technology University Website. The main objective of centre is to provide better support and services to the users for their individual as well as collective growth.

4.6 Amount spent on maintenance in lakhs:

i) ICT

Rs. 6578.38 lakhs

ii) Campus Infrastructure and facilities

Rs 1585.10 lakhs

iii) Equipments

Rs 437.49 lakhs

iv)Others

Rs 4684.25 lakhs

Total:

Rs. 13285.22 Lakhs

Criterion – V

5. Student Support and Progression

5.1 Contribution of IQAC in enhancing awareness about Student Support Services

The newly admitted students are apprised of the activities of the counseling cell during the orientation program by the Chief Student Counselor appointed by the Director. The department nominates faculty member(s) to this cell on the advice of the Chief Student Counselor. General information is sent out to all students of the department informing them of the services extended by the cell and inviting them to meet the faculty coordinator of the department. The students are encouraged to seek guidance on academic, general or psychological issues, if necessary. Also, semester wise results are forwarded to the Student Counselor of the department by the Academic Section who prepares a list of students whose performance is observed to be below average or poor. Such students are then invited to meet the counselor or any faculty member of their choice on a fixed date and time (changes possible on request of the student). Such meetings are arranged at least twice in a semester and are chaired by the Head of the Department and may include anybody who might be of help to the student. The students are advised to improve performance and are given suggestions or options for clearing their backlog courses.

The advising process is designed to ensure that each student selects a set of courses during each semester that meets minimum grade requirements and which can result in the student making efficient and orderly progress in meeting the academic requirements as listed in the course scheme. The advising process also helps to identify and solve problems the student may be confronting in achieving the educational objectives.

Each department has an Academic Counselor for advising the students. He is also a one point contact for issues related to academic performance or any other issues faced by the students. The students are encouraged to meet him to seek guidance on any matter related to academic performance. Individual faculty members routinely spend time with students during and after classes discussing any issues related to the course, student problems, and advice them on all matters as desired related to academic, placement, industrial training and career goals. Faculty members are often members of co-curricular activities in the department and provide ample opportunities for faculty to answer student questions in an informal environment.

5.2 Efforts made by the institution for tracking the progression

The University has CILP (Centre for Industrial Liaison & Placement) and counseling cell which provides career guidance, training and placement to the students. The students of Thapar Institute of Engineering and Technology University have taken initiatives at Science & Technology Entrepreneur's Park towards creating awareness on opportunity exploration and to shape a career smartly, ultimately aiming at development of entrepreneurs; exploring inventive dimensions and reaching new heights by organizing sessions related to career and personal positioning of an individual, through a series of interactive hours, personal discussions and individual guidance supported by experts.

Science and technology Entrepreneurs Park (STEP) at Thapar Institute of Engineering and Technology University has been established in the year 2005 jointly by NSTEDB, Department of science and technology, GOI to create Entrepreneurial opportunities and fostering economic growth through business incubation. STEP is involved in creating atmosphere ecosystem for innovation and entrepreneurship between academics and industry, sharing ides and experiences. STEP provides necessary infrastructure for business incubation and opening new avenues for students, teachers, researchers and managers.

5.3 (a) Total Number of students

UG	PG	Ph. D.	Others
5489	1405	658	0

(b) No. of students outside the state

3532

(c) No. of international students

42

Men

No	%
5342	70.71%

Women

No	%
2210	29.24%

Last Year UG (2015 batch)						This Year					
General	SC	ST	BC	Physically Challenged	Total	General	SC	ST	OBC	Physically Challenged	Total
1178	97	4	22	2	1303	1368	112	7	30	0	1517

Demand ratio -1:14Dropout % - 8.9%

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

Nil

No. of students beneficiaries

5.5 No. of students qualified in these examinations: This data is approximate as exact numbers are not available

NET 16   SET/SLET   GATE 450   CAT 350

IAS/IPS etc 5   State PSC 6   UPSC 8   Others 75

5.6 Details of student counselling and career guidance

The University has a counseling cell which is chaired by a Chief Student Counselor appointed by the Director. Each department/school nominates faculty member(s) to this cell on the advice of the Chief Student Counselor. General information is sent out to all students of the department informing them of the services extended by the cell and inviting them to meet the faculty coordinator of the department. The students are encouraged to seek guidance on academic, general or psychological issues, if necessary.

The semester wise results are forwarded to the Student Counselor of the department by the Academic Section who prepares a list of students whose performance is observed to be below average or poor. Such students are then invited to meet the counselor or any faculty member of their choice on a fixed date and time (changes possible on request of the student). Such meetings are arranged at least twice

in a semester and are chaired by the Head of the Department and may include anybody who might be of help to the student. The students are advised to improve performance and are given suggestions or options for clearing their backlog courses. The advising process is designed to ensure that each student selects a set of courses during each semester that meets minimum grade requirements and which can result in the student making efficient and orderly progress in meeting the academic requirements as listed in the course scheme. The advising process also helps to identify and solve problems the student may be confronting in achieving the educational objectives. The student academic Counselor is also a one point contact for issues related to academic performance or any other issues faced by the students. The students are encouraged to meet him/her to seek guidance on any matter related to academic performance. Individual faculty members routinely spend time with students during and after classes discussing any issues related to the course, student problems, and advice them on all matters as desired related to academic, placement, industrial training and career goals. Faculty members are often members of co-curricular activities in the department and provide ample opportunities for faculty to answer student questions in an informal environment. The details of these activities are available with each department/school and will be made available during the visit of the expert committee.

No. of students benefitted | Overall 500

5.7 Details of campus placement (2015-16, UG only)

On campus			Off Campus
Number of Organizations Visited	Number of Students Participated	Number of Students Placed	Number of Students Placed
172	802	640	85

5.8 Details of gender sensitization programmes-

Thapar Institute of Engineering and Technology University is committed to creating and maintaining a community in which students, teachers and non-teaching staff can work together in an environment free of violence, harassment, exploitation, intimidation and stress. This includes all forms of gender violence, sexual harassment and discrimination on the basis of sex/gender or amongst the same sex members. Every member of the University should be aware that while the University is committed to the right to freedom of expression and association, it strongly support gender equality and opposes any form of gender discrimination and violence. All the complaints in this regard can be made to the committee duly constituted by the Thapar Institute of Engineering and Technology University, Patiala.

5.9 Students Activities

5.9.1   No. of students participated in Sports, Games and other events

State/ University level | 377 | National level | 02 | International level | --

No. of students participated in cultural events

State/ University level | 3200 | National level | 150 | International level | -

5.9.2   No. of medals /awards won by students in Sports, Games and other events

Sports: State/ University level | 33 | National level | 02 | International level | 01 |

Cultural: State/ University level | 08 | National level | 8 | International level | 1 |

5.10 Scholarships and Financial Support:

	Number of students	Amount (Rs IN LAC)
Financial support from institution	538	527.26
Financial support from government	65	104.18
Financial support from other sources	25	4.25
Number of students who received International/ National recognitions	NIL	NIL

5.11   Student organised / initiatives

Fairs   : State/ University level | 12 | National level | 04 | International level | 01 |

Exhibition: State/ University level | 08 | National level | 04 | International level | |

5.12   No. of social initiatives undertaken by the students | 06 |

5.13 Major grievances of students (if any) redressed: Nil

Criterion – VI

6. Governance, Leadership and Management

6.1 State the Vision and Mission of the institution

Vision

"To be recognized as a leader committed to Excellence in Higher Education, Research and Innovation that meets the aspirations of the global community."

Mission

- To redefine and revolutionize Indian engineering education by unlocking the beauty of engineering and applied sciences for the current and future generation.

- To instil excitement of engineering in young minds.

- To make Patiala, Punjab and India proud of being the most sustainable region of the world through creating, disseminating and applying actionable engineering knowledge.

6.2 Does the Institution has a management Information System

Yes. Thapar Institute of Engineering and Technology University, Patiala has implemented e-solutions software for its academic and other related activities including human resource management and financial management. Academic activities, such as, conduct of mid semester test and end semester examination, central repository of marks and grades of the students, assigning the grades to the students by faculty members and students reaction survey have been implemented using this software. Online facility for registration information, date-sheet, seating plan and duty chart has been provided to all the concerned through Web-Kiosk. On-line quizzes have been started for core courses. Computerized DMCs of students are sent to the parents.

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

6.3.1 Curriculum Development

As a first step towards embarking on this journey to contemporize the academic systems and processes at Thapar University, an Academic Review of the engineering departments at TIET University was completed by a team of experts from Trinity College Dublin in November 2014 on our request. Trinity submitted a detailed written report about the findings. The objective of the review was to identify the gaps between the current performance levels of Thapar and the targeted levels which would take Thapar education systems to a significantly higher paradigm. The review process covered review of curriculum, research, staffing, infrastructure, governance, academic and administrative decision making, strategic and implementation planning encompassing much of the entire academic culture of the University. The findings report set out a path, by means of a set of recommendations, to achieve a closing of the performance gap. There were also some observations and recommendations which are core to the contemporisation process. An overall plan for change was then prepared. For implementing the findings of the academic review, as a first step the harmonization of curriculum was taken up to bring it up to date with global standards. The second academic review was undertaken by Trinity in Janaury 2016 and all postgraduate programs and programs offered by the Schools were covered.

Minimum Pass Marks

It is important to realise that the marks in individual papers are essentially useful symbols for grading and ranking students in a course in a consistent and equitable manner. The present grading system of

awarding grades based on total marks obtained by the students would be applicable as documented in the Academic Regulations approved by the Senate. However, for each individual course a minimum of 33 marks would be required to be obtained by the student to pass the course with the lowest pass grade. In all project based courses (those courses where no formal written examination is conducted (e.g. Project Semester, Engineering Design II or III) a minimum of 50 marks will be required to pass the course.

For the purpose of awarding grades, all students with marks less than 33 were awarded "E" (fail) grade. The normal distribution curve was used to award grades as per the existing regulations at TU. The minimum marks considered for assessing the normal distribution will be 33. This would mean all students at 33 will be automatically awarded "C⁻" grade and other grades will be awarded based on normal distribution. **The Examination Board is the highest body deciding on matters related to the examination results in a department/school**. The AVGP and other matters related to final grading is also its sole discretion.

Spread sheet with provisional grades

All the academic staff entered marks in the ERP system as is the current practice. The internal examiners also proposed a grade for each student considering the guidelines listed above. The DOCA office then prepared a spread sheet of the total marks obtained by each student along with the grades proposed by the internal examiner.

The Examination Board will review all the marks and may pass a student if he has up to two courses with no less than 30 marks and above 33 in all other courses. Similarly, the board may consider passing a student who has at least 27 marks in one course and more than 33 in all the remaining courses. All student results will be reviewed on a case by case basis. The Examination Board will also review the answer scripts on a sampling basis to check for consistency against the model solutions provided earlier.

COURSE Learning Outcomes (CLO)

The attainment of course learning outcomes was measured for the courses offered during this semester. We had conducted CLO surveys as an in-direct measurement of CLO's twice in the semester (once before the Mid Semester Test and again before the End Semester Exams. Subsequently, a direct measurement of student performance from the questions asked during exams during the semester as linked to learning outcomes was also completed. The scores from the direct and in-direct measures were then combined to assess the overall attainment of course learning outcomes and objectives.

ACTION TAKEN REPORT – ACADEMIC REVIEW 2014 and 2016

An Academic Review of four departments at TIET University was completed by Trinity during November 2014 and Jan 2016. A detailed report about the findings of the review was received. The objective of the review was to identify the gaps between the current performance levels and those levels which would be needed to help Thapar rising to a university of significance on the global stage. The academic review covered curriculum, research, staffing, infrastructure, governance, academic and administrative decision making, strategic and implementation plan encompass much of the entire academic culture of the University. The findings report set out a path, by means of a set of recommendations, to achieve a closing of the performance gap. There were also some observations and recommendations which are core to the contemporisation process. A substantial overall plan for change was thereafter prepared. The academic review thus became a first step to develop an action plan for implementing the necessary changes.

Laboratory and Physical Infrastructure

INFRASTRUCTURE

Mccullough-Mulvin Architects are developing the following infrastructure for Thapar University

- Computer Science Block
- Lecture hall complex
- Library
- Three Student residences for 2500 students
- Other academic buildings
- Face lifting and modernization of existing buildings

A presentation on these building will be made during the steering group meeting.

Thapar has also started procurement of Lab equipment as agreed with Trinity in June 2015. The following equipment is being procured this year:

- 8 CNC Milling Machines
- 8 CNC Turning Machines
- Data Acquisition Systems
- 370 Desktop PC's for Computer, Civil, Electronics and Mechanical Engineering
- Infrastructure for Buggy and Catapult projects

An Innovation Centre/Venture Lab would be set up at TU to run accelerator program open to teams of Thapar students (undergrad and postgrad) with an early-stage business idea. This unique incubator will provide coaching, expert advice, seed funding and access to space and facilities needed to test out and launch new ventures. The program will support students in developing investor-ready ventures and will be supported by a network of Thapar alumni and friends.

Research Professorships - Joint TCD / Thapar Chairs

The Engineering Chair will be named KC THAPAR Chair Professor in Engineering and the Computer Science Chair will be titled LM THAPAR Chair Professor in Computer Science. TIET University will transfer the 50% of the annual amount payable for the two chairs by Jan 31, 2016. An invoice has been received from Trinity which is being processed.

TIET University will be involved in the selection process of the two chairs and Director TIET University or his nominee will act as a member of the selection committee. TIET University will also be represented by Dean Contemporization and Accreditations on the short listing committee to be constituted by Trinity.

The hiring process is proposed to be completed by April 30, 2016.

The following areas have been shortlisted for the Thapar chairs to be established at Trinity.

Engineering

Sustainable Energy Systems: including energy efficient materials for engineering applications, energy modelling of buildings, lean construction, renewable and smart grid.

Advanced Manufacturing Engineering: Advanced robotics, additive processes for manufacturing, product development and design, process monitoring and instrumentation.

Communications and Media Processing: signal processing through audio, speech, video and communications processing to content, augmented reality and creative technologies; future networks.

Water and Sanitation: including decentralized sanitation, contaminant hydrology and hydrogeology, water resources, aquifer management, low energy/cost water and wastewater treatment.

SCSS

Smart and Sustainable Places: including Internet of Things, autonomous systems/services, multi-agent systems, adaptive systems, Intelligent Transportation Systems, smart grid/demand-side management, smart water management.

Educational Technology: personalisation, mobile learning, augmented reality, assessment technology and learning analytics.

Machine Learning for Data and Content Analytics: Machine and statistical learning algorithms applied to digital content (text, audio, image, video), focus on scalability and integration of methods for modelling, prediction and decision making.

Future Internet Architectures and Cloud Computing: Scalable, secure, protocols and architectures to allow energy-efficient delivery of computing services over a globally distributed infrastructure.

Curriculum Harmonization

- Curriculum of first two years discussed and harmonized with Trinity during March and June 2015 visits by Thapar staff.
- The course scheme and syllabus for years 3 & 4 discussed and agreed in October 2015.
- Developed and reviewed the course learning outcomes for the subjects for all years of study.
- The syllabi of all courses finalized and signed off by the respective departments.
- Senior design projects and individual research projects discussed and collected samples of projects that may be replicated. A list of all senior design projects during the last five years has been created.

Engineering Design Projects

- Thapar team joined the relevant TCD academic staff responsible for the Mangonel and Buggy projects and learnt everything hands on while it was conducted at Trinity.
- Developed and detailed the infrastructural and material requirement for various projects (Catapult, Buggy and others). This includes the lab space requirement for the projects.
- Documented the Standard Operating Procedure (SOP) for evaluation of the projects and also how learning outcomes for these projects are attained.
- Identified and developed more project themes that can be offered at TU in view of the larger intake of students.

Harmonization of schools

The schools at Thapar primarily offer only PG programs and also support the engineering departments in teaching of Maths, Science and humanities modules. The engineering departments have aligned their curriculum with Trinity School of Engineering and School of Computer Science. A similar activity has been initiated for the sciences and maths programs. At this time, the TU schools offer conventional M.Sc programs which are largely content driven and in order to modernize and enrich these programs, an academic review has been scheduled by Trinity staff.

Some of the steps that will be undertaken are as under:

- The schools of Physics, Chemistry and Maths underwent an academic review by Trinity. TU schools had submitted their self-assessment report to Trinity for the review process.

- TCD and TU jointly analyzed the findings of the review and submitted an action plan for implementing the findings of the review.
- TU will depute heads of the Schools to TCD for appropriate period for exposure and training for implementing the enrichment program for the mutually agreed period in 2016. The TU team will harmonize the curriculum of the PG programs.
- The schools will check the possibility of offering joint programs akin to engineering programs.
- External examiners in consultation with TCD will be introduced at TU.

PG Engineering Programs

In the first phase of implementation of the Contemporization Program, the UG programs were harmonized and aligned with Trinity. This was extended to include the PG programs offered by the four engineering departments (Civil, Mechanical, Electronics & Computer Engineering). Further, the collaboration with Trinity has been expanded to promote research collaboration through a broad range of strategies, which include:

- Encourage joint research between institutions in the areas of technical knowledge by offering structured PhD programs in joint supervision mode.
- Identify opportunities for an articulation agreement (as with UG programs) for 2-year postgraduate engineering programs.
- Exchange, on a reciprocal basis, faculty and students for limited periods of time for the purpose of education and/or research for postgraduate or PhD programs.
- Exchange of knowledge, faculty and academic staff for short-term and, as funding and other circumstances permit, longer-term projects and visits.
- Joint applications for research funding to various Government and Non-Governmental organizations.
- Setting up of at least one state of the art Research Centre at TIET University over the next five years.

The two Thapar sponsored Professors at Trinity will spearhead all or some of these activities besides taking up research in thematic research areas. Such a partnership will result in setting up of a research centre at TIET University over the next five years.

6.3.2 Teaching and Learning

Pedagogy

The teaching pedagogy employed for the engineering programmes offered at TIET University reflect the long held ethos that engineering education should be broad-based to enable graduates to develop throughout their professional careers, finding solutions for as yet unseen challenges. The partnership with Trinity focuses on strategies to deliver a research inspired, outcome based educational experience to the students at all levels. This is a major shift in focus from the current content-oriented imparting of engineering education to a project-based and outcome-oriented educational experience. The new teaching pedagogy lays emphasis on applying engineering skills through relevant engineering design projects, improving team-working skills and awareness of issues relating to ethics and professionalism. Also, all academic staff is encouraged to bring in cutting-edge research ideas from their own research into their teaching

TIET University will sponsor two high impact Chair Professors (research) positions at Trinity in thematic research areas of interest to both partners. The Professors would spend time both at Thapar and Trinity and would lead a major research effort which will culminate into setting up of a State of the Art research centre at Thapar in the next five years. The thematic areas will be inter-disciplinary and would involve several other academic staff. The teams would focus on attracting large research funding and publications in high impact journals.

Thapar is also setting up a Research Committee to establish a structured PhD program, form inter-disciplinary research groups, encourage/ support the academics to publish, take research students, raise research funding and feed this knowledge into advanced undergraduate and postgraduate courses and oversee the setting up of a major Research Centres. The committee will review the metrics for measurement of research output (Publication quantity and quality, PhD student(s) produced, research funding raised, measures of innovation and impact).

The committee will identify research thematic areas in consultation with TCD which will be pursued during the next 5 years.

6.3.3   Examination and Evaluation

Each department/School has constituted an Examination Board for each year of study. All the instructors teaching courses to that batch (defined by the year of admission) form the members of the board. An external member will be appointed only for the senior years of the UG program (one for Year 3 and another for Year 4) and the final year of the PG programs.

The course instructor prepared the question papers along with model solutions which were sent for review to Trinity in October 2015.

6.3.4   Research and Development

As compared to the last few years, this year saw an increase in the research activities, wherein more funds were received for sponsored projects, higher number of Ph. D. students got registered and resource generation through consultancy also increased. Out of the sponsored projects received from various funding agencies (UGC, AICTE, DST and DOE, etc), 29 were completed during the year under review and 118 projects are ongoing and progressing towards their completion. 22 new projects were received during the year 2015-16. The total funding received during the year was Rs. 1041.67Lacs. During the year, 582 technical papers were published in reputed national and international journals listed in SCI/SSCI, and several research papers were presented/ published in conferences, seminars and workshops.

Sponsored Projects	2013-14	2014-15	2015-16
Received	25	21	22
Ongoing	106	127	118
Completed	17	18	29
Funds Sanctioned (Rs. in lakh)	467.49	466.35	1041.67

Publications	2013	2014	2015
Scopus	459	562	582
In other Journals	164	226	139
In seminars, conferences and workshops	276	160	224

6.3.5 Library, ICT and physical infrastructure / instrumentation

The Central Library TIET University is housed in a centrally air conditioned spacious premises covering an area of 25,000 square feet. The central library is the core of academic services, and therefore, become a key place in academic and research activities. With its collection of over 89746 books, it provides the ready to use information support to its users. Besides printed books and journals, central library collection includes e-Books, bound volume of journals, CD-ROMs, DVD, On-line databases, audio-video material, standards, specifications, theses, reports etc. The library collection consists of Textbooks, Reference Books, Book Bank, Encyclopaedias, Handbooks, Standards, etc in the field of all engineering discipline and sciences, and humanities.

Library remains open 24x7 throughout the year, even on gazette holidays. However, Essential services are available till 8:30 PM. Most of the library operations are automated. Library catalogue (OPAC) can be searched from anywhere and subscribed e-resources can be accessed from the Campus only.

The emphasis of the library is to provide personalized information services in terms of subject support, research support, and content delivery to target user with minimum time. The library services are fully automated with modern web based library management system with automatics alert system.

The Library offers the following facilities/services:
1. **Digital Resource Centre:** Digitization project of Library is in progress. First phase i.e. digitization of all the previous thesis is over. This laboratory also provides place for faculty and group of students for working on their library learning based assignments.
2. **Reading Facilities:** Three separate reading halls, including one exclusively for faculty and research scholars are available. In addition to these reading halls, reading space is available in the learner's zone, Community library and Print theses sections as well. Library has in all seating capacity for 350 readers.
3. **Community library** for the families of staff and faculty members is a part of Library, where books, newspapers and magazines for children, grownups, ladies and senior citizens are available and this section remains open from 08:00 A.M. to 08:30 PM on all the working days.
4. **Information and communication infrastructure:** The Library is equipped with state of the art facility which includes 200 nodes for Wi-Fi network in addition to wired connectivity. A number of computers are dedicated for library users. Resources like digital scanners, printers, photocopiers and surveillance system for security etc. are available.
5. **Online resources and services**: These can be accessed through its website http://cl.thapar.edu. the library also manages the University's digital archive Dspace@TIET University which can be accessed at http://dsapce.thapar.edu:8080/dspace. All the dissertations and theses are now submitted to the University on Dspace@TIET University. During the year 586 submissions were made on DSpace.
6. **Membership:** Library caters to faculty, staff and students of all the three institutions on the Campus. Students registered for Distance Learning course of University can also become members. Private local resident, professionals and institutions & industries and alumni of the university can also become member of Library on nominal fee.
7. **Document Delivery Service**: Research paper/articles which are not available in the subscribed e-journals and print journals are procured by the library on request through Document Delivery Service (DDS). Library interacts with other libraries and agencies as NISCAIR for procuring research articles.
8. **Library on Wheels:** To make faculty members and research scholars aware about 'Resources & Services @TIET University Library' library conducts and organize presentations in different departments from time to time.
9. **Collection Development:** This year 8225 volumes of books were added to the collection. During the financial year 2013-14 Rs 31 lakh was spent on the purchase of books and Rs.70 lakh on subscription of print and e-journals.

10. **Library Hours:** Library remains open for 24 hours throughout the week. Library services are provided from 8 am to 8.30 pm from Monday to Saturday. During the examination, the library services are also made available on Sundays.
11. **Book Loans:** During the reporting year a total of 34226 books were loaned out to the members.

6.3.6 Human Resource Management

The University has set high standards for imparting quality education and thus induct faculty with higher academic profiles, urge to excel in their respective fields and serve the students and the University with dedication and high quality standards. All the faculty members inducted are qualified and competent teaching in all the academic courses. The University does not recruit any faculty without PhD since 2010. Some of the faculty members recruited prior to this have been encouraged to register for PhD program at the University or other institutions of high repute. Most of these faculty members are at an advanced stage of completing their research work. The University has facilitated their work by giving them one to two semesters off on their request.

The University has established a Professional Development Allowance for a variety of academic activities for all levels and has encouraged faculty to participate in conferences, symposiums, workshops, training programs etc. The University provides seed money for organizing conferences and other faculty development programs to all academic units from time to time.

For the non teaching staff, the University has organized Computer proficiency up gradation programmes for to achieve the desired standards and all the ministerial staff has been trained to handle computers for the routine jobs. The non teaching staff has been motivated and the self development achieved can be gauged from the higher qualifications attained by its staff during the last five years.

The University has organized Computer proficiency up gradation programmes for the ministerial staff to achieve the desired standards and all the ministerial staff has been trained to handle computers for the routine jobs. The non teaching staff has been motivated and the self development achieved can be gauged from the higher qualifications attained by its staff during the last five years.

6.3.7 Faculty and Staff recruitment

As part of the Contemporisation Programme, TIET University is also setting up a Centre for Academic Practice and Student Learning (CAPSL) which is similar to the 'Trinity's CAPSL unit. Through this centre, TU will expose the 'entire faculty to in-house learning modules including e-learning during the next 3-5 years. An academic needs' analysis is currently underway based on the questionnaire which has been administered to all academic staff. The Senior Academic Developer from Trinity will act in a consultancy role to help Thapar establish the CAPSL centre that will have the skills, knowledge and ability to assist Thapar to achieve its institutional mission and strategic goals. As the centre gets established the CAPSL unit will draw from academic staff across different disciplines with specific interest in and knowledge of different aspects of higher education pedagogy. CAPSL will have one senior academic developer from Trinity and two e-Learning technologists: continuous professional development (CPD) modules and certified programmes will be delivered by CAPSL staff, which will be continuously supported by Trinity academics and other staff. A number of specific needs have been identified (i) Training of all Thapar academic staff, (ii) Awareness training of senior staff (iii) Training of trainers to enable self-sufficiency. The training programmes will be developed based on core needs identified. Trinity staff and associates will deliver this programme at Thapar during the academic year. Each module will comprise 2 two-hour workshops and assessment exercises: participants will be provided with all necessary materials. The existing curriculum will be adapted to reflect the specific academic needs of Thapar faculty. A mentoring programme can also be provided. Participants will be

required to submit a teaching portfolio for assessment, which will be developed over the course of the year and will relate to their teaching and learning. Successful candidates will be awarded a Special Purpose Certificate Academic Practice. Trinity in consultation with Thapar will agree the core modules that will form part of the special purpose certificate.

The training of all academic staff and on-going professional development will be instrumental in establishing the culture necessary for the CAPSL Centre to grow and contribute meaningfully to the contemporisation programme.

Human Resource is an important aspect for the growth of any higher education institute. TIET University makes special efforts for recruitment and retention of quality faculty. The desired profile of the faculty at all levels has clearly been defined. The positions are advertised through print and electronic media. The impact of the change has been clearly visible through larger interest among prospective faculty to join Thapar University. A meticulous process of evaluation that includes seminar presentation and personal interviews with a carefully chosen panel of experts is adopted. A regular position is offered only to PhD holders. To provide impetus to the effort and facilitate selection and induction of highly qualified faculty members at the entry and higher levels, we now entertain applications throughout the year. Following tables contains the details of faculty recruitment and internal promotions affected during this year.

Statement of Joining from May to August, 2016

S. No.	Deptt./School	Professor		Associate Prof.		Asstt. Prof.		Visiting Prof.		Visiting A.P.		Lecturer (Cont)		Lecturer (Cont) Through Walk-in-interview	
		Offered	Joined	Offered	Joined	Offered	Joined	Offered	Joined	Offered	Joined	Offered	Joined	Offered	Joined
1	CHED			1*	1*										
2	MED			1*	1*	9	4			1*	1*	5+2*	3+2*	1	1
3	EIED			1*	1*	2+1*	2+1*					5*	5*	1*	1*
4	ECED	1*	1*			5+2*	3+2*	1*	1*	1*	1*	7+2*	6+2*		
5	CED					3+1*	1+1*					3+2*	2+1*	2	2
6	CSED	3*	3*	2*	2*	2+1*	2+1*					16+9*	9+9*	5	5
7	SOM			1*	1*	2+1*	2+1*					2+2*	2*	5	5
8	SPMS			3*	3*	2	2								
9	SCBC													2	2
10	SHSS					1 (Cont)*	1(Cont)*	1	1					5	4
11	SEE			1*	1*										
	Total	4*	4*	10*	10*	25+7*	16+7*	1+1*	1+1*	2*	2*	33+22*	20+21*	20+1*	19+1*

* Internal candidates

Recruitment and Promotions

Department	Prof	Assoc. Prof.	Visiting Asstt. Prof.	Asstt. Professor			Lect. Cont.	Total
				GP 7000	GP 8000	GP 8500		
CED	0	0	0	2	1	0	4	07
CHED	0	1	0	0	1	4	0	06
CSED	3	2	1	3	1	1	23	34
DBT	0	0	0	0	0	2	0	02
ECED	1	0	1	5	3	4	8	22
EIED	0	1	0	2	5	3	6	17
MED	0	1	3	3	2	4	6	19
SCBC	0	0	0	0	1	2	2	05
SEE	0	1	0	0	0	1	0	02
SHSS	0	0	0	0	1	0	4	05
SOM	0	1	0	3	3	0	7	14
SPMS	0	3	0	0	2	0	0	5
LMTSOM	0	0	0	0	0	0	0	0
TOTAL	4	10	5	18	20	21	60	138

Academic Grade Pay Upgradation

Department	Asstt. Prof.		Total
	GP 8000	GP 8500	
CED	1	0	1
CHED	1	4	5
CSED	1	1	2
DBT	0	2	2
ECED	3	4	7
EIED	5	3	7
MED	2	4	6
SCBC	1	2	3
SEE	0	1	1
SHSS	1	0	1
SOM	3	0	3
SPMS	2	0	0
TOTAL	20	21	41

TIET University has also instituted a scheme for award of excellence in Teaching; Academic Research; Projects/Consultancy and Contributions to University Activities. While award for excellence in Teaching is given to 10% of the faculty members, 5% of faculty members get excellence award in Project/Consultancy and other 5% get in Academic Research. There are six awards for University Contributions. These awards are divided into three categories A, B and C. Category A award carries an amount of Rs. 1.5 lacs, Category B carries an amount of Rs. 1.0 lacs and Category C carries an amount of Rs. 0.75 lac. These awards are given annually.

6.3.8 Industry Interaction / Collaboration

S. No	Name	Activity
1.	Secure Net Technologies	Set up "centre of excellence " , running various courses on security such as security-5, network-5, ECSS & CEH
2.	Wipro Technologies	WIPRO is running various courses to upgrade the overall skills of teachers of engineering institutions as well as the students through two programs named as Wipro mission 10X technology Learning Center (MTLC) and Unified Technology Learning Platform (UTLP). Department has conducted one training program under this relationship.-2013
3.	Crompton Greaves Ltd.	One ongoing project -"PREPARATION AND CHARACTERIZATION OF POLYMER/CERAMIC FIBRE AND CELLULOSE COMPOSITE PAPER FOR ELECTRICAL INSULATION" by Dr Rajeev Mehta One more projects has been started. Project was initiated by Dr. Gangacharyulu. Each year ME/MTech students are sent to CG for one year project training. This year Six MTech Students are sent for one year project training-June 2013.
4.	ISA Group Lille, FRANCE	Student Exchange and Faculty Exchange with Biotechnology Department. The activity will co-ordinated by Dr. Abhijit Ganguli. Scholarship for more than 100 students from Indian and French Govt. One faculty had gone Group Lille, France during the summer vacation to deliver a lecture on academic and research exchange programmes at TIET University Attended two meeting/discussion sessions on environmental Food Biotechnology with Prof. Bertrand, Head Environmental Group. Initiatives on Joint Research Projects in the area of Bio-Process and Green Polymer Application for Remediating Environment. One TIET University student Mr. Jatin Sharma BTech BT (4th Year) has been selected for Masters in Food Science and Management at ISA. Scholarship will be offered to the student.
5.	University of Waterloo, Canada	Dr. S. Bedi from UW visited TIET University for two months and delivered 10 lectures on CAD / CAM/ Design Fresh MoU signing has been initiated. Dr KK Raina, Director, Dr S K Mohapatra, Dean of Academic Affairs and Dr. Ajay Batish HMED visited UWO in Sept. 2013
6.	TCS PhD Research MoU	TCS is sponsoring selected PhD Candidates for a Maximum of 4 years. Department currently have 3 TCS Research Scholars. A Stipend of Rs. 23,000 per month is given for the First 2 Years and Rs. 25,000 per month for next 2 years by TCS. TCS supports participation of TCS Research Scholar and respective guide in 1 International Refereed Conference, held

S. No	Name	Activity
		outside India, and 2 National Conferences in India.
		TCS awards One-time Rs 1 Lakh Contingency Amount to the Institute for every TCS Research Scholar to meet any incidental expenses.
		TCS also has a detailed plan for continuing interaction between TCS Research Scholars and TCS Innovation Labs.
7.	CISCO Net Academy	A global education initiative from Cisco Systems, offers networking programs, like the (Cisco Certified Network Associate) CCNA and (Cisco Certified Network Professional) CCNP courses, which prepare students for the certification exams of the same name, and other computer-related courses.
		150 students got their modules cleared and attained discounts to appear in CCNA industrial exam.
8.	EC-Council, USA	EC-Council Academia is an innovative education initiative that delivers information and security skills to improve career and economic opportunities around the world. It provides online courses, assessment exams, CBT videos and lab activities via iPrep, iVideo, iExam, iLearn and iLabs platform. It also prepares candidates for industry leading EC-Council certifications exams such as CEH, CHFI, ECSA/LPT.
		5 students successfully completed C|EH exam and have attained Certified Ethical Hacker Certification from EC-Council USA
9.	Microsoft Edvantage Program	Under Microsoft Edvantage program, all Faculty and staff members can use latest legal software provided by Microsoft.
		The faculty members have the benefit of using all Microsoft products and keys from this website.
10.	Oracle Academy	Under this program CSED, received licensing to Oracle Database products on huge discount, also learning material is freely downloadable.
		Students can appear for Oracle certification at discounted price
11.	Apple University Program	CSED started with Course on Mobile Application development which emphasizes app development under android and iOS platform.
		CSED received free SDK (Software Development Kit) and are part of AUP for uploading apps developed by students after testing done by Appstore.
12.	IBM University Program	CSED is part of this program since 2005 and faculty, students have gained knowhow into IBM technologies by attaining certifications and training from IBM free of cost,
		10 faculty members and students were trained under this program for Rational Software Architecture (RSA)
13.	Infosys Campus Connect	Launched by Infosys in May 2004, CC is a unique academia-industry initiative to "architect the education experience".
		Goal is to build a sustainable partnership with engineering

S. No	Name	Activity
		education institutions in India and abroad for mutual benefit; producing "industry ready" recruits.
		• Around 800 students got professional benefits from such training.
		• CSED has got critical inputs on Curriculum changes
		• Planning to Set up of Centre excellence in thrust areas of CS (initial proposal is being prepared)
14.	Naveen Jindal School of Management, the University of Texas at Dallas, U.S.A and LM Thapar school of management - 2013	Faculty and Student exchange, Joint research
15.	Association of chartered certified accountants (ACCA)-2013	The purpose of MoU is to have the international certifications from ACCA in finance and management programmes. With these certifications the profile of the students will be enhanced and they will get more acceptability in the market
16.	INTEL	Intel® Embedded University Program (IEUP) caters to Enhance the Presence Of Intel® Embedded-based Systems Curriculum and to Enable Technology Leaders of Tomorrow an Understanding of Embedded Systems and Provide a Solid Foundation for Designing And Developing new Technologies. This Program supports in Curriculum Development, Student Contests, and Research. It holds an Annual Research and Education Summit giving Professors opportunities to interact with Peers, Intel Architects and Engineers. Following Equipment's were Funded by Intel under this program IXP1200 NP (2), IXP2400 NP (2), IXP425 (2) Kits.
17.	University of Twente, Netherlands	To initiate a pilot bachelor student exchange program, establishing a joint research center on Entrepreneurship and Innovation between the Netherlands Institute of Knowledge Intensive Entrepreneurship (Nikos) of the University of Twente and the LM Thapar School of Management of TIET University.
18.	Ritsumeikan University, Japan	Exchange information on research and educational programmes, to jointly organize short-term continuing education programmes, seminars, conferences, or workshops to exchange, on a reciprocal basis, faculty and students for limited periods of time for the purpose of education and /or research.
19.	University of Missouri-Kansas City	Joint Research Proposals, • Joint Research Guidance at PG and PhD level, • Joint conduct of workshops on upcoming areas of technology Hybrid International Master of Science in Computer Science Program. Dr Kevin Truman, Dean of the University visited TIET University in 11th Sept 2013. Visit to University of Missouri-Kansas City is being planned to

S. No	Name	Activity
		further look into the courses.
20.	Engg. School of Information and Digital Technology, Paris, (EFREI) FRANCE.	Student and faculty exchange as well as scholarships and waivers for the students for the Master programme at EFREI.
21.	Royal Melbourne Institute of Technology	Mapping of Bachelor Information Technology and Bachelor of Technology (computing Studies) with TIET University program as 3+1 and 3+2 arrangement * Mapping of MCA programs and development of an agreement in BIT and BT Computing studies) and MCS
22.	NVIDIA for CUDA teaching center(CTC) as well as CUDA Research Center (CRC).	NVIDIA is a pioneer in parallel computing architecture using CUDA programming. - Hardware infrastructure required for the task procured - - CUDA teaching centre approved for TIET University
23.	Spoken Tutorial IIT-Bombay and MHRD	Workshops, certifications and training on upcoming technologies
24.	ICICI	Trinity is an initiative by ICICI Bank that promotes and furthers the cause of innovation and entrepreneurship amongst the youth community in India.
25.	Trinity College Dublin-Ireland	Thapar Institute of Engineering & Technology University Patiala (TIET University P) and Trinity College Dublin (TCD) have collaborated in areas of mutual interest of both the institutions. The broad scope of this collaboration would jointly develop a contemporisation program for Thapar Institute of Engineering and Technology University covering broadly the following areas. Academic curriculum review and development • Research Orientation including supporting lab infrastructure. • Pedagogy (including teaching-learning center) • Governance Structure • Physical Infrastructure • Faculty training and development • Develop programs in Humanities and Liberal Arts etc
26.	DRDO-Institute of Nuclear Medicine and Allied Sciences, Delhi	Exchange of researchers, scholarly and pedagogical material, collab. In research programs, pilot UG/PG exchange program for project work
27.	PGI Chandigarh	Recognizing the importance of research and development in the areas of biomedical science , engineering and technology
28.	University of Groningen	The Parties agreed on the following areas of Entrepreneurship, Innovation and Psychology: a) to exchange, on a reciprocal basis, faculty and students for limited periods of time for the purpose of education and /or research.

S. No	Name	Activity
		b) to exchange knowledge, faculty and academic staff for short-term and, as funding and other circumstances permit, longer-term projects and visits. c) to exchange information on research and educational programmes, d) to exchange information on teaching, learning material and other literature relevant to their educational and research programmes, e) to explore over time other international partnership activity to be defined.

6.3.9 Admission of Students

The complete admission schedules are advertised in the leading National Dailies and magazines well in advance and repeating the advertisements two to three times before the counselling sessions. The schedule is also simultaneously displayed on the Website of the University. The queries of the aspirants are handled telephonically and through email promptly. The transparency is achieved by displaying the data and results of applicants and those short listed on the University Website. Merit lists are also displayed on the Notice Board based on the Counselling conducted publicly. Full transparency is ensured at levels by the Thapar Institute of Engineering and Technology University management.

ADMISSION TO THE BE/BTECH PROGRAMME

The candidate has passed 10+2 or equivalent examination with at least 60% marks (55% for SC/ST candidates) in aggregate of three subjects, namely, Physics, Mathematics and any one subject out of Chemistry, Biology, Biotechnology and Computer Science OR Minimum 60% (55% for SC/ST) marks in a Diploma recognized by AICTE or a state board of technical education of at least 3-year duration. (ii) has secured at least 20% aggregate marks (15% for SC/ST candidates) in JEE (Main)-2016. This clause shall not be applicable for the PGN, GoI, JKM, JK students & N-E students OR

has passed 10+2 or equivalent examination with at least 80% marks (75% for SC/ST candidates) in aggregate of three subjects, namely, Physics, Mathematics and any one subject out of Chemistry, Biology, Biotechnology and Computer Science. (ii) has secured at least 15% aggregate marks (10% for SC/ST candidates) in JEE (Main)-2016. This clause shall not be applicable for the PGN, GoI, JKM, JK students & N-E students

The admission shall be made on the basis of merit of score in JEE (Main)-2016. The first five toppers of the recognized Boards of India in the examinations held in 2016, shall be given direct admission to the first year of UG program, with the condition that they must have appeared in JEE (Main)-2016 but the entrance test score of such students shall not be required for admission. They shall be allocated branch of their choice. Such candidates shall have to furnish proof of being toppers from their respective boards. Tuition fee shall also be waived off for such students provided they maintain minimum CGPA of 8.50 in subsequent semesters. Only toppers having first five positions among science stream (NonMedical) at 10+2 of a respective board shall be considered

ADMISSION TO THE POST GRADUATE PROGRAMMES

PhD PROGRAMME

A candidate seeking admission to the degree of Doctor of Philosophy must have obtained ME/MTech/MPhil/MCA/MSc/MA/MBA/CA or equivalent with minimum CGPA of 6.00 on a 10 point

scale or 55% marks in aggregate where marks are awarded or NET (UGC/CSIR) qualified. Candidates are admitted on the basis of merit of Entrance Test and Interview conducted by the University. The candidates who secure minimum of 20% marks in the written exam are only be called for Interview. During interview, a candidate is required to indicate area of research. Relaxation for appearing in the Entrance Test may be given by the University to those candidates who have qualified UGC/CSIR (JRF).

ME/MTech PROGRAMME

Admission to all the ME/MTech programmes shall be made on the basis of valid GATE Score in respective discipline. First preference will be given to GATE qualified candidates and who have obtained at least 60% (55% for SC/ST) marks in the aggregate in the qualifying examination from a recognised University.

MCA PROGRAMME

The admission to the MCA program is made on the merit of the entrance test conducted online by the University across India. To be eligible for admission the candidate must have a recognized bachelor degree of minimum 3 years duration in any discipline with at least 60% marks (55% for SC/ST) in aggregate. Mathematics must be studied at 10+2 level or at graduation level.

MSc PROGRAMMES

Admissions in all the M.Sc. programs shall be made on the basis of merit prepared by giving 40% weightage to 12th marks and 60% weightage to Graduation marks (aggregate marks upto pre-final year). Overall minimum 60% (55% for SC/ST) in graduation shall be required to be eligible for admission. Graduation must be done from a recognized University

Detailed information about all the programmes and the admission process can be accessed at www.thapar.edu

6.4 Welfare schemes for

Teaching	Yes
Non teaching	Yes
Students	Yes

6.5 Total corpus fund generated

As on 01-04-2015   = Rs 37.75 cr
Additions during the year 2015-16   = Rs 0.53 cr
Balance as on 31-03-2016   = Rs 38.28 cr

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 (ISO9000)	STQC	Yes	IQAC
Administrative	Yes (ISO 9000)	STQC	Yes	Internal Audit

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?

Each department/School has constituted an Examination Board for each year of study. All the instructors teaching courses to that batch (defined by the year of admission) form the members of the board. An external member will be appointed only for the senior years of the UG program (one for Year 3 and another for Year 4) and the final year of the PG programs.

The course instructor prepared the question papers along with model solutions which were sent for review to Trinity in October 2015.

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

NA

6.11 Activities and support from the Alumni Association

Scholarships and Placements/Training

6.12 Activities and support from the Parent – Teacher Association

NA

6.13 Development programmes for support staff

Computer proficiency up-gradation programmes for the ministerial staff to achieve the desired standards and all the ministerial staff has been trained to handle computers for the routine jobs. The non teaching staff has been motivated and the self development achieved can be gauged from the higher qualifications attained by its staff during the last five years.

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

The University is taking the possible initiatives for energy conversation and the new buildings of the University are being designed accordingly to save the energy. The employees and students are advised to use the natural light, turn off the switches of lights, fans etc. whenever not in use, use of LCD monitors for computers, use of tube lights instead of bulbs etc. There are sufficient cross ventilation in laboratories and class rooms to avoid the unnecessary use of electricity. The University has also installed the Power Factor Correction System to save the electricity.

The University has taken several initiatives to make eco-friendly. The University has hired an outside consulting firm for energy auditing and its recommendations are being implemented throughout the University. The use of solar energy specially for heating water in student hostels has been attempted in

one of the largest hostel on campus and has been a successful experience. The street lighting in some sections has been made functional with solar energy. There has been wide plantation throughout the campus and Thapar Institute of Engineering and Technology University is one of the greenest campuses in the region. The university has dedicated plantation areas and one such park "Nirvana" has come up beautifully during the last three years.

The University has made provisions of rain water harvesting system in all the new buildings.

The biological waste from various laboratories is collected by Semb-Ramky Environment Management Pvt. Ltd., Ludhiana on weekly basis as per MOU signed between university and them. All other solid waste of residences, hostels and campus is being collected and disposed off at Municipal Corporation dumping ground. Treatment of waste water is done by Sewage Treatment Plant (STP) and reuse of treated water for irrigation.

The University has followed the Government of India notification related to e-waste (Management & Handling) Rules 2011 that came into effect from May 1, 2012. These rules were circulated to all the Heads of Units and were advised to understand the definition of the e-waste mentioned at page no. 28, sub clause (k), of clause 3 of the said rules. The University comes under the definition of Bulk Consumer which is also mentioned on the same page under sub clause (c) of clause 3 of the said rules and the responsibilities of the "Bulk Consumer" mentioned at page 31 under clause 6 of the said rules and the same has been understood by all concerned. All the Heads of the Departments / Schools / Centres / Units are required to maintain the stock of the e-waste generated in their respective Departments / Schools / Centres / Units in the Form-2 of the said rules. They are supposed to complete entries from Sr. No. 1 to 5 of the Form-2. The e-waste generated can be sent to Central Stores once in six months with a copy to Chairperson, e-waste Management Committee. Central Stores has identified a specific area to store the e-waste sent by different units for final disposal to the authorized vendor M/s Singbros Mobility Solutions, D-85, Focal Point, Patiala.

Following steps have been taken for carbon neutrality:
- The students are not allowed to use the powered vehicles in the campus. They use only bicycles to move in the campus.
- Only LPG cylinders are used in hostels and other places for cooking.
- Installation of Solar Water Heating system at Derabassi Campus and University is also planning to install the same at Patiala campus also.

Criterion – VII

7. <u>**Innovations and Best Practices**</u>

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

IQAC (Internal Quality Assurance Cell) has been actively involved in improving the academic systems and processes. The IQAC prepared the Annual Quality Assurance reports and organized the academic review of the departments. Based on the report of the academic review an action plan to implement the findings of the academic review has been developed. The academic review during the first phase was undertaken for engineering departments which admit 80% of our total enrolment. The process covered review of curriculum, research, staffing, infrastructure, governance, academic and administrative decision making, strategic and implementation planning encompassing much of the entire academic culture of the University. The findings report sets out a path, by means of a set of recommendations, to achieve a closing of the performance gap. There are also some observations and recommendations which are core to the contemporisation process. In order to kick start this process of developing an overall plan, an operational document has been developed as a first step listing a broad implementation plan for effecting the necessary changes. The operational document has 91 action points and we have put in a sustained effort to achieve to the goals of the University.

The complete action plan is appended at Annexure 1 of this report.

The academic review of all the other schools is in progress.

Some other initiatives of IQAC are listed below:

- The IQAC conducted the SWOT analysis of the University and a University Risk Management strategy which is also described in one of the sections of this report as a major initiative.
- Academic Audits are conducted periodically also as part of ISO-9001: 2008 implementation.
- The peer Team in its visit to the University in 2009 had recommended provision of hostels for more students. The University has constructed Hostel –J and is constructing three new state of the art student residences keeping in mind the increased intake.
- The University has created a central facility called SAI Lab where state of the art scientific equipments needed for latest research in modern areas of sciences has been installed..
- The University has also received a grant of Rs. 12 crore under TEQIP (Technical Education Quality Improvement Programme) of Ministry of HRD, Government of India for infrastructure development.
- The IQAC has also developed a workload model for the academic staff. The model encompasses all major activities of the staff – teaching, research and scholarly activities/administration. The model is in the process of being implemented.

<u>**Major Initiative 1**</u>

Contemporization Program:
In line with its mission to provide world class educational experience by incorporating global best practices in its format, Thapar Institute of Engineering and Technology University has embarked on a Contemporarization Program under academic mentorship of Trinity College Dublin, the University of Dublin, Ireland. The Contemporarization Program has been designed to deliver a research inspired, outcome based educational experience to the students in partnership with Trinity, an international

university of repute. The unique collaboration has been contemplated to give students a flavour of international educational experience, prepare them for professional careers, and expose them to state of the art facilities and cutting edge research in the fields of engineering and science. The broad scope of this collaboration covers all the major academic and research activities of Thapar Institute of Engineering and Technology University including developing a outcome based teaching pedagogy, research orientation including supporting lab infrastructure, academic curriculum harmonization, physical Infrastructure, faculty training and development, and develop new joint programs. The broad scope of the agreement is depicted in the figure below.
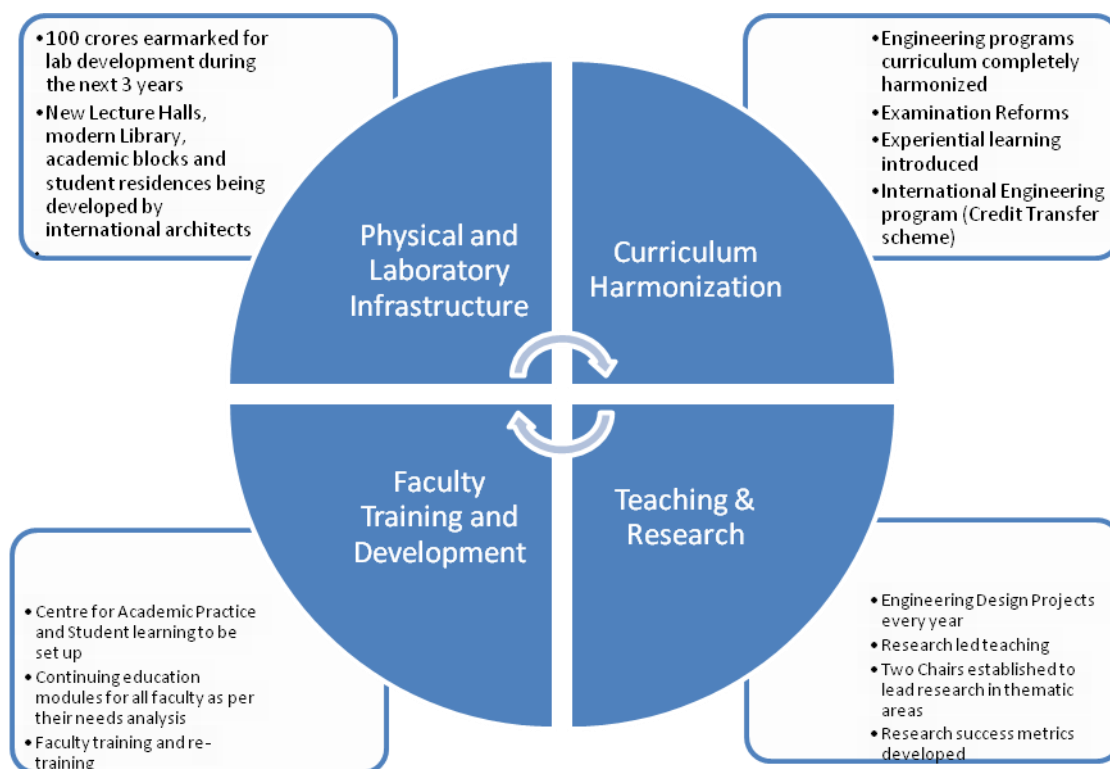
As a first step towards embarking on this journey to contemporize the academic systems and processes at Thapar Institute of Engineering and Technology University, an Academic Review of the engineering departments at Thapar Institute of Engineering and Technology University was completed by a team of experts from Trinity College Dublin in November 2014 on our request. Trinity submitted a detailed written report about the findings. The objective of the review was to identify the gaps between the current performance levels of Thapar and the targeted levels which would take Thapar education systems to a significantly higher paradigm. The review process covered review of curriculum, research, staffing, infrastructure, governance, academic and administrative decision making, strategic and implementation planning encompassing much of the entire academic culture of the University. The findings report set out a path, by means of a set of recommendations, to achieve a closing of the performance gap. There were also some observations and recommendations which are core to the contemporisation process. An overall plan for change was then prepared. For implementing the findings of the academic review, as a first step the harmonization of curriculum was taken up to bring it up to date with global standards.

Curriculum Harmonization

The curriculum of the undergraduate engineering programs has been harmonized in line with Trinity with an objective is to create a global outcome based, project led education programs where all students are exposed to a harmonized curriculum. The Trinity curriculum places greater emphasis on research inspired and project led teaching which has been incorporated at Thapar. For this purpose, Thapar deputed teams of its senior faculty to Trinity to understand and implement a modern engineering curriculum. Some of

the significant changes made in the curriculum is introduction of three large engineering design projects during the first two years followed by a capstone and an individual research project during the later years. Thapar has adopted the learning outcomes approach for teaching with greater reliance on self-directed learning, mini-projects within the courses, research-led teaching, use of project work and assignments. Most of the first two years of curriculum across of undergraduate programs will remain the same and the specialized courses will be taken up during the later years.

Pedagogy

The teaching pedagogy employed for the engineering programmes offered at Thapar Institute of Engineering and Technology University reflect the long held ethos that engineering education should be broad-based to enable graduates to develop throughout their professional careers, finding solutions for as yet unseen challenges. The partnership with Trinity focuses on strategies to deliver a research inspired, outcome based educational experience to the students at all levels. This is a major shift in focus from the current content-oriented imparting of engineering education to a project-based and outcome-oriented educational experience. The new teaching pedagogy lays emphasis on applying engineering skills through relevant engineering design projects, improving team-working skills and awareness of issues relating to ethics and professionalism. Also, all academic staff is encouraged to bring in cutting-edge research ideas from their own research into their teaching

Thapar Institute of Engineering and Technology University has sponsored two high impact Chair Professors (research) positions at Trinity in thematic research areas of interest to both partners. The Professors would spend time both at Thapar and Trinity and would lead a major research effort which will culminate into setting up of a State of the Art research centre at Thapar in the next five years. The thematic areas will be inter-disciplinary and would involve several other academic staff. The teams would focus on attracting large research funding and publications in high impact journals.

Thapar has set up a Research Committee to establish a structured PhD program, form inter-disciplinary research groups, encourage/ support the academics to publish, take research students, raise research funding and feed this knowledge into advanced undergraduate and postgraduate courses and oversee the setting up of a major Research Centres. The committee will review the metrics for measurement of research output (Publication quantity and quality, PhD student(s) produced, research funding raised, measures of innovation and impact).

The committee has identified research thematic areas which will be pursued during the next 5 years. The committee is headed by Dean Research and Sponsored Projects and includes several key research active staff.

Faculty Training and Development

As part of the Contemporisation Programme, Thapar Institute of Engineering and Technology University is also setting up a Centre for Academic Practice and Student Learning (CAPSL) which is similar to the 'Trinity's CAPSL unit. Through this centre, TU will expose the 'entire faculty to in-house learning modules including e-learning during the next 3-5 years. An academic needs' analysis is currently underway based on the questionnaire which has been administered to all academic staff. The Senior Academic Developers appointed for the purpose will act in a consultancy role to help Thapar establish the CAPSL centre that will have the skills, knowledge and ability to assist Thapar to achieve its institutional mission and strategic goals. As the centre gets established the CAPSL unit will draw from academic staff across different disciplines with specific interest in and knowledge of different aspects of higher education pedagogy. CAPSL will have one senior academic developer from Trinity and two e-Learning technologists: continuous professional development (CPD) modules and certified programmes

will be delivered by CAPSL staff, which will be continuously supported by Trinity academics and other staff. A number of specific needs have been identified (i) Training of all Thapar academic staff, (ii) Awareness training of senior staff (iii) Training of trainers to enable self-sufficiency. The training programmes will be developed based on core needs identified. Trinity staff and associates will deliver this programme at Thapar during the academic year. Each module will comprise 2 two-hour workshops and assessment exercises: participants will be provided with all necessary materials. The existing curriculum will be adapted to reflect the specific academic needs of Thapar faculty. A mentoring programme can also be provided. Participants will be required to submit a teaching portfolio for assessment, which will be developed over the course of the year and will relate to their teaching and learning. Successful candidates will be awarded a Special Purpose Certificate Academic Practice. Trinity in consultation with Thapar will agree the core modules that will form part of the special purpose certificate.

The training of all academic staff and on-going professional development will be instrumental in establishing the culture necessary for the CAPSL Centre to grow and contribute meaningfully to the contemporisation programme.

Laboratory and Physical Infrastructure

Thapar Institute of Engineering and Technology University has developed a business plan, wherein the University will spend over Rs 500 crores in improving the laboratory and physical infrastructure at Thapar Institute of Engineering and Technology University. In order to modernize the Institution, Thapar team has developed a modernization plan for the important teaching and research laboratories in consultation with Trinity. Thapar Institute of Engineering and Technology University has also hired world class foreign architects to develop key academic infrastructure that would include lecture hall complex, library, CAPSL centre, student residences and other academic blocks. Face lifting and modernization of older buildings has also been planned in a major way. Thapar Institute of Engineering and Technology University is also engaging services of a consultant to implement a international ERP system to manage and govern the academic and administrative functions.

The rendered view of some of the proposed building that will come up by 2017 are provided below:

Learning Centre
Student Residences – Boys
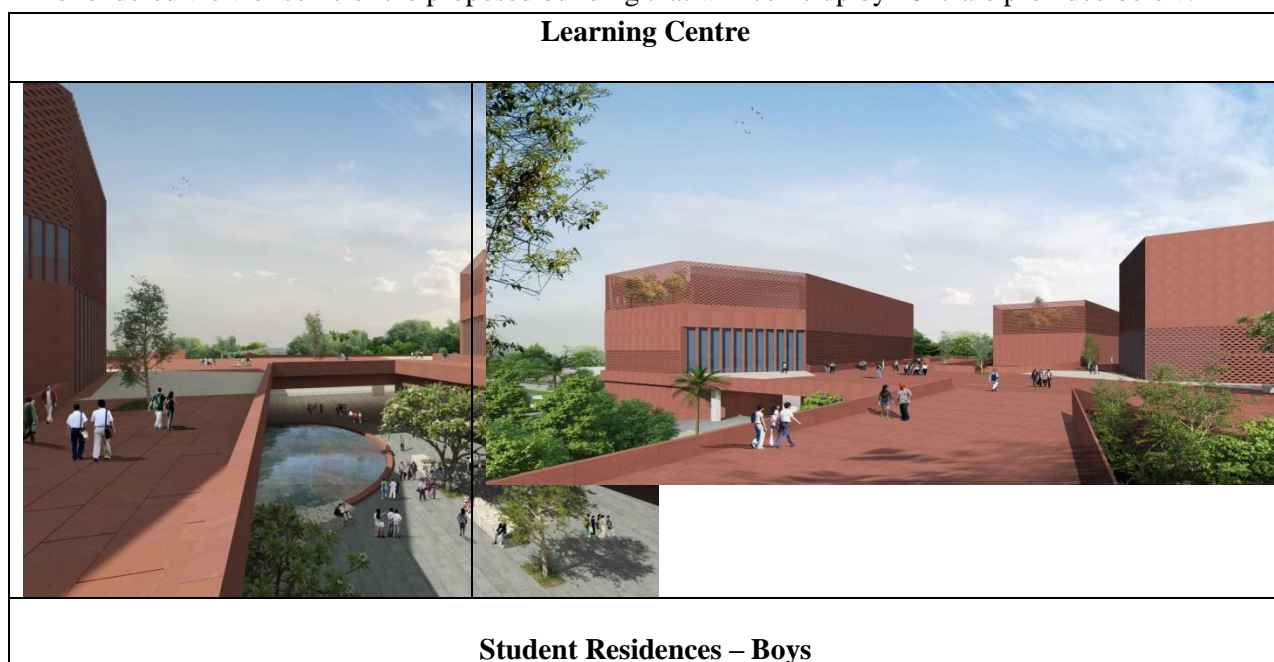
Girls Residences

An Innovation Centre/Venture Lab would be set up at TU to run accelerator program open to teams of Thapar students (undergrad and postgrad) with an early-stage business idea. This unique incubator will provide coaching, expert advice, seed funding and access to space and facilities needed to test out and launch new ventures. The program will support students in developing investor-ready ventures and will be supported by a network of Thapar alumni and friends.

Examination Reforms

Thapar Institute of Engineering and Technology University has initiated reforms in the way, examinations are conducted. In the contemporary set up, the concerned instructor prepares the question paper along with model solutions to each question and seeks feedback from a faculty colleague from the cognate area. The same is then be sent for vetting to an outside expert (Trinity in this case). After the conduct of the examination, the marks are uploaded on an academic software which generates an excel sheet listing the marks obtained by each student in all the subjects. An examination board is then

convened consisting of internal and at least one external member who reviews sample answer scripts, projects and the marks obtained by the students.

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

Please See Annexure 1

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

Best Practice 1

Academic Workload Model

The primary purpose of the Workload Models is to assist in transparent and equitable distribution of work between faculty across various departments/schools. The workload model will be a key tool in relation to the efficient and effective use of resources. The design of the workload model may vary between Department/Schools, reflecting their specific nature and profile of the activities of each unit. However, the proposed model should be designed having regard to the core principles, and operational aspects as listed below.

Academic workloads will consist of three elements reflecting the core academic functions of teaching, research and contribution to University (administration)/scholarly activity. Just to emphasise again that the allocation model in each academic unit may consider the factors of that unit, particularly in relation to nature of outputs (e.g. only PG programs, size of Department/School) and complexity of activity.

The precise design of the workload model will however adhere to some core principles as set out below. The model is broadly capable of capturing the workload of each faculty member and is designed to ensure fairness and transparency in relation to the expectations and opportunity for faculty to perform. The model will be flexible enough to cater for unanticipated needs of the Department/School particularly teaching, and in this regard, allocation of duties to faculty and the broad application of the model, is a matter for the Head of DPPC. The annual workload allocation will be available to the faculty of the Department/School for information.

Academic Workload Model – Operational Aspects

The following section proposes a common operational model to form the basis for the design of Department/School-specific workload allocation model using the above principles. A common operational model is needed to ensure a level of consistency between the designs of Department/School-specific workload allocation models across the University.

Unit of workload allocation

The basis of the operational model is that workload is described in terms of a nominal unit of workload allocation where the number of workload units that should be allocated to a full-time faculty member is the same across the University.

Assignment of Workload Units

Assignment of workload units to different activities can then be made by Schools based on local knowledge of the effort involved in their delivery. For example, if there are nominally 500 units in a full workload in a semester, a full course of 80+ contacts hours engagement would account for 100 workload

units (a 20% time commitment). The number of units can be decided for the individual elements of the model and the numerical values are proposed for them. The model is designed to capture all the significant activities of faculty in the University. It is suggested that measurements should be standard across the University so as to ensure that workloads are equivalent for all members of staff.

The University proposes to have an Academic Workload Model in place for the coming academic year 2016/17.

The following template as shown in Table 1 uses three broad areas of activity carried out by faculty: Teaching, Research & Contribution and Scholarly Activity/ Administration. Some individual elements for inclusion in the model have been identified. For some elements values for workload units is proposed as existing at Trinity. Such standardisation will allow us to compare different departments and schools but the basic objective is to be able to compare workloads.

Basic principles

The workload model is designed to ensure equity between various faculty colleagues in the allocation of tasks; it ensures recognition for the different activities which contribute to the work of the University. It is proposed that for a full-time member of staff the number of workload units should be 1,000 units; all faculty members will be expected to contribute to the three broad areas of Teaching, Research & Contribution and Scholarly Activity/ Administration.

Research and Research Active

Faculty members that are research active according to the University criteria will be allocated a standard number of units (proposed at 200). It is proposed that the model should make no attempt to measure research output apart from the simple active/inactive category for the purpose of this model. Faculty members that are not research active should be allocated a lower number of units for time (assuming that everyone teaching at the university must have time to keep up with their discipline etc beyond simple preparation of teaching).

Seniority and Allocation between Areas

The model assumes that senior faculty spend less time teaching and more on research and administration. The model however assumes that all faculty have a standard norm for the division between different areas. It is also assumed that if some member of staff does not meet the minimum number of units in a particular area, he will need to compensate for it in another area. The model also assumes that this minimum allocation of units to teaching must be met.

The Basic Model

Area	Activities	Range of Units (Illustrative)		
		Professor	Associate Professor	Assistant Professor
Teaching (Every faculty member must acquire the minimum number of teaching units unless exempted by official order)	Undergraduate and postgraduate teaching (lectures, labs, tutorials) taking account of contact hours, marking etc.	250-300	400-450	550-600

Research & Contribution	All research-related activity, not specified in individual workload	450-600	350-450	250-400
Scholarly Activity/ Administration	Administration (Department/School/ University positions);	200-250	150-200	50-100
Total		1,000	1,000	1,000

Detailed issues

1. Research

The 'reserved time' allocated for research could be fixed at 200 units and will be allocated to all staff who meet the requirement of being research active. A faculty member would be designated as a research active staff if he/she publishes at least 6 papers (single or co-authored) in a journal of repute (SCI/SSCI with a minimum impact factor of 0.5) in a three year block period. The other units can be accumulated are by supervising, commercialising, attending conferences counts as part of research. Departments/Schools may wish to encourage specific activities and such activities could receive similar recognition. The methodology proposed to accumulate these units is as under:

Research and Contribution	Suggested Units	% of total time
Research active (Minimum 6 papers in SCI/SSCI with IF of min. 0.5 in a block period of 3 years)	200	20%
Dissertation PG	20	2%
Research supervision (primary supervisor)	50	5%
Research supervision (co-supervisor)	20	2%
PI of an ongoing research project	100	10%
Co-PI of an ongoing research project	60	6%
PI of an ongoing consulting project	30	3%
Co-PI of an ongoing consulting project	20	2%

2. Teaching

The model allocates units per contact hours (@ 2 units per lecture hour and 1 unit per lab/tutorial hour). For example an assistant Professor with a teaching load of L:T:P :: 6:2:6 per week in a semester can accumulate units as under:

Lecture   6/week for 15 weeks @ 2 units per hour = 180 units

Lab/Tutorial   8/week for 15 weeks @ 1 unit per hour = 120 units

Thus the total number of units accumulated in a semester = 300 units.

3. Scholarly Activity/ Admin

The scholarly work includes activities undertaken to promote University profile such as conduct of workshops, conferences, seminars, members of journal editorial boards, representing TU at National/International events or similar activities. The administrative activities can be defined (there could be many more) as under:

Scholarly Activity/ Admin	Suggested Units	%
Deputy Director	250	25%
Dean	200	20%
Head of Department/School	150	15%
UG/PG/PhD Coordinator	100	10%
Time Table coordinator	60	6%
Project Semester Coordinator	100	10%
Member of University Committee	10	1%
Member of Dept/School Committee	5	0.5%
Coordinator Dept/School reports	30	3%

* Maximum contribution to total workload for supervision of PG and PhD students is 200

**Maximum contribution to total workload for Contribution to University is 250

***The primary responsibility of the lab and tutorial sessions is with the course coordinators and those engaged in lecturing the classes. It is their responsibility to ensure that the instructors in such sessions are trained and updated.

Best Practice II

Measuring attainment of Student outcomes and course learning outcomes
(This activity is undertaken by the IQAC every semester)
To assess each outcome, we use performance criteria and course learning outcome for each course. We have defined measurable course learning outcomes for each course and their attainment is measured for every course in every semester. The example below describes the complete procedure of measuring the attainment of student and course outcomes

The assessment process uses both direct and indirect measures to measure the attainment of each outcome. The examples of such measures are given below:

Direct Measures

- Student Assignments
- Projects
- Examinations

In-direct measures

- Surveys and questionnaires
- Exit interviews

To assess each outcome, we use performance criteria for that outcome. For example in outcome A, we defined four performance criteria (A1 to A4) that need to be met to successfully achieve that outcome at a minimum target performance level for a program. In the section below, the assessment of Outcome A using performance criteria A3 is explained as an example. The academic staff identified that performance criterion 'A1' would be achieved if the corresponding activities in three courses, i.e., Computer Aided Design (UME401), Advance Machine Design (UME701) and Mechatronics (UME802) are successful. For example, at the program level, A3 reads

- *A3: Applying scientific and/or engineering principles towards solving engineering problems.*

In order to assess the achievement of outcome 'A' through performance criterion 'A3', the courses are already identified in Table 4.2. For each of these three courses, at the course level, identify the course outcome that would measure the achievement of outcome 'A' through performance criterion 'A3'.

- **Course level**

As the performance criteria at the program level flow to the course level, then specific interpretation in each course constitute the course outcomes in each course. For example: specific interpretations listed above are the actual course outcomes in these courses that contribute to the program level A3 performance criteria. In each course, we assess the level of achievement of each course outcome. The data are then combined to analyze and evaluate the program level achievement of each program outcome. If any student outcomes are not met, action is taken for improvement.

7.4 Contribution to environmental awareness / protection

The University has very lush green campus. The Horticulture Section of the University is responsible to maintain the lawns, fruit orchard, Nirvana Park (A 6 Acre Park containing 3000+ plants of difference species) and other areas. The University has also won many prizes in state level flower competitions.

PARYAVARAN WELFARE SOCIETY (PWS)

Tree Plantation Drives: Rapid constructions and mushrooming of housing colonies have led to the depletion of green cover in many parts of our country. The importance of trees in purifying the air, reducing global warming, preventing soil erosion, conservation of water, maintaining the ecological balance, providing natural resources as medicines, habitats for faunal species, providing nutrients to the soil etc. is well known. Unfortunately, the overall green cover, not just in Patiala but in other parts of the country is also reducing and as a consequence of this, pollution is increasing at an alarming rate. Increasing the green cover by tree plantation is one of the easiest yet effective measures towards reducing this imbalance.

During the July to September 2014, PWS carried out tree plantation drives at different locations within the Thapar Institute of Engineering and Technology University and nearby areas of district Patiala like Central divider Sirhind road, Central divider Rajpura road and Power house colony.

So if you want to save our mother earth from further destruction please do contribute because your little contribution is the only thing that is needed for the big cause of conservation.

7.5 Whether environmental audit was conducted?   Yes ☐   No ☑

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

Please see Annexure 2

8. Plans of institution for next year.

ACADEMIC PARAMETERS			
S No	Indicators	Method of Computation	Benchmark value
1	Demand Indicator	Total no of admissions in all courses per year / total no of candidates who applied	1:10
2	Assessment of Course learning Outcomes	No of courses in which CLO assessment has been introduced / Total no of courses	75%
3	Average no of activities like conducted / year 1. Workshops 2. Seminars 3. Symposia/Conference		Per Dept/ School 1. Two 2. Two 3. One
4	Outcome based education	Number of courses with projects offered in a semester/Total number of courses in a semester	30%
5	New programs introduced in last year	New programs launched / total no of programs	**5%**
6	Percentage increase in books/journal in last year	No of books/journals purchased in last year / No of books available at the beginning of the year	20%
7	Number of NET/SET/GATE qualified students	Total No of GATE qualified students admitted / Total applications for PG programmes	75%
8	Minimum workload of teachers	Teaching, Research and Scholarly/ Administrative work	1000 units
RESEARCH PROFILE			
1	No of research publications per teacher per year in refereed SCI/SSCI journals	Number of Research Publications / No of teachers	2
2	Research grant received per teacher per year	Total research grant received / No of teachers	3.0 lacs
3	Citation Index	Citation value of all research papers/ Total no of research papers published	2 per paper (Scopus database)
4	Percentage of full time research scholars	Total no of full time research scholars / Total no of research students	75%
5	Percentage of faculty getting awards, honors	Total no of awards/honors / Total no of teachers	2%
6	Number of patents per year		5 per year
7	University h-index	Scopus	60
OTHER			
1	Resources generated through external resources	Resources generated through external sources / total plan budget for the year	10%

2	Percentage of depts. Collaborating with other agencies	Total no of collaborations / total no of departments	100%	
3	NIRF Ranking by MHRD	2016-17	Top 15	
4	Percentage increase in physical infrastructure	Increase in physical space / space at the beginning of the year	15%	
5	ABET Accreditation		All	UG programs

Name Prof Ajay Batish   *Name   Prof Prakash Gopalan*

_____   _____

Signature of the Coordinator, IQAC   *Signature of the Chairperson, IQAC/ Director*

_____***_____

An Academic Review of four engineering departments and three Science and Maths Schools at Thapar University was completed by a team of experts from Trinity College Dublin during the second week of January 2016. A detailed report about the findings of the review was received on in Feb 2016. The objective of the review was to identify the gaps between the current performance levels of TU and those levels which would be needed to bring the University into the top ten for the university rankings of India resulting in TU rising to a university of significance on the global stage. The process covered review of PG curriculum, research, staffing, infrastructure, governance, academic and administrative decision making, strategic and implementation planning encompassing much of the entire academic culture of the University.

The findings report sets out a path, by means of a set of recommendations, to achieve a closing of the performance gap. There are also some observations and recommendations which are core to the contemporisation process. A substantial overall plan for change is required. In order to kick start this process of developing an overall plan, this operational document is the first step listing a broad implementation plan for effecting the necessary changes.

The operational document has action points for each department and school and sustained effort from all of us to achieve the goals of the contemporization programme.

ACTION PLAN - Academic Review of four departments (Computer Science and Engineering)

Action No. 1	**Gap identified:** Three ME/MTech programmes reviewed are content-intensive, with little time for self-directed learning and reflection. The learning outcomes are not well expressed and need to be redrafted in accordance with best international practice. Additionally, little thought seems to have been given to the alignment of laboratory and practical work with the learning outcome.		
Recommended Action(s) *This is decided to constitute four different committees to review the CLOs of PG Courses as per TCD recommendations. The following committees were proposed :* *ME Computer Science* *1. Dr. Parteek Bhatia , Coordinator* *2. Dr. Shalini Batra* *3. Dr. Ashutosh Mishra* *ME Information Security* *1. Dr. Maninder Singh, Coordinator* *2. Dr. Neeraj Kumar* *3. Dr. Jhilik Bhattacharya* *ME -Software Engg* *1. Dr. Inderveer Chana, Coordinator* *2. Prof. Seema Bawa* *3. Ms. Ashima SIngh* *4. Dr. Rupali Bhardwaj* *ME-CA* *1. Dr. Rajesh Kumar* *2. Dr. Shingara Singh* *3. Dr. Sanmeet Kaur* *It is further decided that these committees should submit their final report by 25th March, 2016*		**Responsibility** HCSED	**Target Date** 25th March 2016
Action No. 2	**Gap identified:** Students undertake both a capstone project and a dissertation in the PG programs– this seems very staff intensive with many evaluations for each one – perhaps they should be combined with less evaluations.		
Recommended Action(s) *DPPC discussed it threadbare. It is correct that evaluations do take a lot of time. Last year three assessments was taken for the capstone project (including the final one). It was felt that continuous assessment is necessary to make the student more consistent. Otherwise, they tend to complete their work near the final evaluation. At some points TCD pointed to have enhanced the evaluation process with proper rubrics, which is again being taken care in these evaluations.*		**Responsibility** HCSED	**Target Date** **Continuous**
Action No. 3	**Gap identified:** The weighting of first and second year is 46 vs 20 credits. It is not clear why this is so –		

	perhaps there is a reluctance to assign so many credits to project and dissertation work. Can more credits be assigned to projects and dissertation?		
Recommended Action(s)		**Responsibility**	**Target Date**
	DPPC agrees with this point. It was raised in last SPGC also. We will like to increase the credits of Capstone project and Thesis Work.	HCSED	**Next Senate meeting**
Action No. 4	**Gap identified:** The exercise to numerically connect learning outcomes with exam results and student opinions is a huge investment of staff time; the benefits of this exercise are not obvious.		
Recommended Action(s)		**Responsibility**	**Target Date**
	DPPC members expressed their opinion in this and left it to DoCA to decide. However, there are many merits in this exercise, which were also pointed out. Few members opined that so much quantization is not required.	DoCA	**-**
Action No. 5	**Gap identified:** PhD projects are unique to the individual – there is little evidence that supervising staff had tried to shape the projects into clusters that could give rise to a group output that is more impressive than the sum of the individual contributions. It would appear that staff view PhD supervision as delivering a supervision service to the student rather that marshalling a team of researchers to make progress in their area.		
Recommended Action(s)		**Responsibility**	**Target Date**
	Department has already given shape to research groups and work has already been started to further show the efforts in this direction.	HCSED	**Already Started** **Continuous progress**
Action No. 6	**Gap identified:** Department PhD students are short of desk space		
Recommended Action(s)		**Responsibility**	**Target Date**
New Spaces are being looked for. The space committee may again do one exercise to give some additional space to CSED. DPPC looks forward to construction of new CSE building. PhD admission numbers may be again relooked to further avoid the situation to go out of hand.		HCSED	**Dec 2016**
Action No. 7	**Gap identified:** The revised structure of the academic term with fifteen week of teaching and two reading weeks has not resulted in reduced teaching. In fact, the reading weeks are in effect testing weeks, being used for tests and evaluations and are not being freed for student reflection and self-directed learning as intended. Reading weeks should be kept clear of all lectures, labs, seminars, examinations, tests and quizzes. There should be no timetabled commitments for the students during reading weeks.		
Recommended Action(s)		**Responsibility**	**Target Date**
DPPC discussed this point. Few members were of the opinion that due to the administrative difficulties in arranging the quizzes (for large numbers) on working days, the evaluations are being taken in reading weeks. Students also tend to skip the classes, when the evaluations are scheduled on regular days. So there were different views on this. However, the teachers should avoid doing evaluations in the reading week.		**Senate**	

Action No. 8	**Gap identified:** The department faces an acute staffing shortage. The student to staff ratio is at a critical level and will worsen given current recruitment practices and the increase in student numbers. This problem must be addressed urgently.		
Recommended Action(s) *Dept will further work with DOFA to address this issue.*		**Responsibility** DOFA	**Target Date**
Action No. 9	**Gap identified:** The department is very short of office space for staff, desk space for PhD students, teaching labs and lecture rooms		
Recommended Action(s) To look for more space. The space committee may again do one exercise to give some additional space to CSED. DPPC looks forward to construction of new CSE building.		**Responsibility** **Space Committee**	**Target Date**
Action No. 10	**Gap identified:** Devise and commence implementation of a five-year strategic plan (10 to 20 pages maximum) to manage the contemporisation transition process. The strategic plan should include a five-year staffing plan (3 to 5 pages maximum), to be revised annually and agreed with the governing authority, which (i) resolves the high student / staff ratio, (ii) builds strengths in a number of strategic research areas, (iii) reduces the high junior senior staff ratio and ensures that the department has the necessary leadership and (iv) introduces mechanisms to enable contract staff to transition to permanent positions.		
Recommended Action(s) Already Submitted to Dean, Strategy		**Responsibility**	**Target Date**
Action No. 11	**Gap identified:** The University should bring its recruitment and promotion criteria into line with the CSE sector. The current checklist-driven approach to selection and promotion is seriously inhibiting staff recruitment and development. Recruiting good CSE academic staff is a problem worldwide. The University's recruitment criteria appear to be overly restrictive and inflexible.		
Recommended Action(s) It will be discussed with DOFA to take up the matter further.		**Responsibility** DOFA	**Target Date**
Action No. 12	**Gap identified:** Senior members of the department should participate in all phases of academic recruitment, including targeting research areas, determining selection criteria (which should be different from selection criteria in other areas), advertising, short-listing, interviewing and selecting candidates.		
Recommended Action(s) Department is already involved in shortlisting up to associate Professor Level. Also, all the candidates up to associate professor are expected to give a presentation in the department. Department is ready to further contribute in this direction as required by DOFA.		**Responsibility** DOFA	**Target Date**
Action No. 13	**Gap identified:** The department should be given autonomy by the University to: (i) determine what is taught, (ii) determine how teaching duties are allocated and (iii) determine how teaching should be delivered and assessed. Developments and changes necessary to implement the contemporisation programme seem to be blocked by over-strict interpretation of UGC regulations by the University Senate. For instance, regulations concerning the number of hours taught, the allocation of marks and the number and nature of assessments seem to be tightly controlled and must be changed if Thapar is to become a research-led university.		
Recommended Action(s) *DPPC feels that minor changes in the above said areas should be in the hands of the dept.*		**Responsibility** Senate	**Target Date**
Action No. 14	**Gap identified:** It is important, and recommended, that teaching allocation is done locally (i.e. by the department) with the aim of matching modules with staff expertise and research		

	interests over time while minimizing "churn".		
Recommended Action(s) *DPPC agrees with TCD and felt that the concerns raised in previous TCD review should be taken care. Student interest should be the first priority.*		**Responsibility** **HCSED**	**Target Date** Dec 2016
Action No. 15	**Gap identified:** Minimise the administrative burden on academic staff by employing and training permanent administrative staff to carry out administrative tasks. This will free up a large amount of the academics' time to concentrate on research activities.		
Recommended Action(s) Senior Office Executive is required		**Responsibility**	**Target Date**
Action No. 16	**Gap identified:** Devise and commence implementation of a transition plan for managing the space requirements of the department prior to the availability of the new building, which staff estimate to be ready in 2019. Student numbers are rising rapidly in CSE programmes, with an additional 600 students (approximate) expected in the next three years. No provisions appear to have been made to accommodate the extra students or indeed the extra staff that must be recruited to cater for them.		
Recommended Action(s) *DPPC requests DoCA to set up a separate task force for a temporary plan to take care of the increase in coming years.*		**Responsibility** DoCA	**Target Date**

ACTION PLAN - Academic Review of four departments (Civil Engineering)

Action No. 1	**Gap identified:** There was a recommendation in the 2014 review for greater partnership with the recently-created School of Energy and the Environment, but this has not been addressed yet.		
Recommended Action(s)		**Responsibility**	**Target Date**
Action No. 2	**Gap identified:** The role of the department in the recruitment process is not fully clear: there needs to be strong departmental input to these appointments. When recruiting, they do not advertise for specific civil engineering specializations, rather they have a general advert and pick the best candidate. This does not lend itself to focusing strategically on certain research areas.		
Recommended Action(s) DOFA to comment		**Responsibility**	**Target Date**
Action No. 3	**Gap identified:** The number of full time PhD students at the moment is relatively low (4 FT) whereas the number of part-time students is more substantial (18). For part time students, it is important that they comply within the standard timelines for thesis submission and attain the expected standards.		
Recommended Action(s) More publicity for the full time Ph.D. program at TU to be done. This will help in getting more full time students. Will avoid taking part time students		**Responsibility** DORSP HCED	**Target Date** 1st August 2016
Action No. 4	**Gap identified:** The types of changes to the assessment systems that are taking place at undergraduate level should also be taking place at postgraduate level. These should include:		

	- Formal exam boards for assessment of students performance on an individual basis across the suite of assessments undertaken, year by year.		
	- The appointment of an External Examiner who previews all postgraduate exam papers (with a full set of model solutions) and will attend the exam board meetings as a quality control check on maintaining standards.		
	- More consistent and clear award of marks for questions should be evident on exam papers for clarity for the students. When it comes to marking the scripts there must be consistency of marking, particularly at the lower end of the scale.		
	- Furthermore, the reviewers noted that in the exam progression rules system, very low mark attainment still allowed students to pass the exam. The reviewers would advocate the introduction of a minimum mark of at least 40% for every exam at postgraduate level: this is, appropriately, higher than the current (and recently introduced) minimum pass mark at undergraduate level of 33%.		

Recommended Action(s)		**Responsibility**	**Target Date**
Exam board format similar to UG to be adopted from the academic year 2016-17. Minimum pass marks to be adopted.		DOAA HCED	May 2016
Action No. 5	**Gap identified:** The credits awarded to semester 3 and 4 should be broadly in line with semesters 1 and 2 for PG programs to reflect a roughly equal level of work. Some work is done on the dissertations in semester 3 and this work should be formally assessed and appropriate credit should be allocated to it. For example, a research plan/proposal could be submitted and assessed, which could include context, experimental design, a planned schedule of work and expected results. In addition, a formal presentation to academic staff (and other students) on the research proposal could be made and assessed, with suitable guiding feedback		

Recommended Action(s)		**Responsibility**	**Target Date**
Agreed. Will be adopted from academic year 2016-17 after taking it to various academic bodies.		DOAA HCED	May 2016
Action No. 6	**Gap identified:** In respect of the marking of the ME dissertations, the reviewers suggest that independent marks should be arrived at by the internal examiners and negotiated if the marks are sufficiently close. Special cases where there is no agreement on the mark to be awarded should be referred to the External Examiner for advice. The criteria for assessing the dissertations should be transparent and a report, written by the supervisor explaining the attainment of the marks awarded under the published assessment criteria, should be provided for every dissertation. In selecting assessors of the dissertations, a blend of staff experience would be desirable.		

Recommended Action(s)		**Responsibility**	**Target Date**
Dissertation evaluation Performa to be modified in guidance with TCD		HCED	May 2016
Action No. 7	**Gap identified:** Consistency of compliance of the learning outcomes with normal taxonomy should be reviewed for all PG modules.		

Recommended Action(s)		**Responsibility**	**Target Date**
Agreed. This has been started from academic year 2015-16. Will be further improved		HCED	June 2016
Action No. 8	**Gap identified:** It was noted that a significant number of the dissertation topics were in concrete and this is clearly one of Thapar's subject strengths in civil engineering. Diversification of research areas can enhance the potential for funding, which in turn would have a positive impact on Thapar's ranking. The number of students taking ME projects in other areas could potentially go on to do PhDs in those areas.		

Recommended Action(s)		**Responsibility**	**Target Date**
Agreed Department staff will work on diversification of research areas in coming years		Dean Resource Mobilization & Planning and the Associate Dean HCED	In coming years 2018

Action No. 9	**Gap identified:** In the ME in Civil Infrastructure Engineering, the projects examined by the reviewers focused on transport (highways) and materials and there was none on water resources engineering, even though four of the staff specialize in this area. Water-related projects were offered but not taken up by the students. Whilst acknowledging that giving students a free choice of topics is has some benefits, the department could consider, for example, providing water resources projects that relate to highways, thus accommodating students' interests in that topic whilst also spreading the load of project supervision more equitably amongst the staff.		
Recommended Action(s)		**Responsibility**	**Target Date**
As job opportunities are more in Highway Engineering, Department will work on developing topics on application of Water Resource Engineering in Highway Engineering		HCED Program coordinator	Academic year 2017
Action No. 10	**Gap identified:** The majority of the PG students apparently did not feel the need to study in the evenings or during the weekend. This could suggest that they are not sufficiently challenged by the course. The preponderance of tutorials may mean for them that extra private study is perceived as not being necessary. This culture should change, perhaps by reducing the number of contact hours and promoting more self-directed learning.		
Recommended Action(s)		**Responsibility**	**Target Date**
We will include this in teaching learning methodology. Tutorials are to be planned in self directed learning mode.		HCED	Academic year 2016-17
Action No. 11	**Gap identified:** The PG students were disappointed that they did not have exposure to laboratories in the first semester and may not have it in the second semester either. Access to software in support of the lectures needs to be reviewed. While library facilities are adequate, recommended texts in support of modules are not always available in the library.		
Recommended Action(s)		**Responsibility** HCED	**Target Date** June 2016
Will include lab components in curriculum from academic year 2016-17			
Action No. 12	**Gap identified:** In order to attract more high quality PhD students, Thapar should consider re-structuring the balance of expenses against income, with a view to providing an incentive for excellent students to apply.		
Recommended Action(s)		**Responsibility**	**Target Date**
Dean RSP to comment		Dean RSP	
Action No. 13	**Gap identified:** Regarding new teaching staff – issue of career structure; they were uncertain about the criteria for promotion and their permanency. They made the point that with the high teaching-related workload it was difficult to find time for research. They acknowledged that the senior staff in the department is very supportive, but there is no formal mentoring in place as yet.		
Recommended Action(s)		**Responsibility**	**Target Date**
Teaching load will be reassessed and time will be given for Research.		HCED	2016-17
Action No. 14	**Gap identified:** It was observed that the recommendation (from the previous review) that new staff should have the opportunity to choose their own modules had been brought into effect, but one of the consequences of this is that middle level staff are being asked to take a significant number of new modules to accommodate the choices of the new staff, which has significantly increased their workload.		
Recommended Action(s)		**Responsibility**	**Target Date**

	Will work as per university policy. However faculty specialization should be considered for allotment of modules.	DOAA HCED	

Action No. 15	**Gap identified:** Develop better employment conditions and career structure for technical staff, in order to attract high quality employees; Appoint suitability qualified administrative staff to reduce the administrative burden on academic staff, including providing attractive and rewarding employment conditions		
Recommended Action(s)		**Responsibility**	**Target Date**
University policy to incorporate such issues.		Director	

Action No. 16	**Gap identified:** Reduce workload for academic staff In order to free up time for research by: o Streamlining work associated with contemporisation programme, once main recommendations have been implemented; o Providing additional and effective administrative support; o Providing more teaching assistants and allowing them to mark the undergraduate assignments; o Reducing the contact hours per week; and o (When facilities allow) return to delivery of first year modules as single delivery (rather than double or multiple, as at present);		
Recommended Action(s)		**Responsibility**	**Target Date**
University to appoint one technical background person who can handle such activities.		Director	

Action No. 17	**Gap identified:** Introduce self-directed learning as part of ME programmes, partly by reducing the number of tutorials, while still ensuring that learning outcomes are met;		
Recommended Action(s)		**Responsibility**	**Target Date**
We will include this in teaching learning methodology. Tutorials are to be planned in self directed learning mode.		HCED	Academic year 2016-17

Action No. 18	**Gap identified:** Explore joint structured PhD programmes between TU and TCD		
Recommended Action(s)		**Responsibility**	**Target Date**
DOCA to comment. There are various common areas of interest between TU and TCD staff.		DOCA HCED	Academic year 2016-17

Action No. 19	**Gap identified:** Permit greater autonomy to the department for strategic planning, decision making, including recruitment and module content; and Increase the transparency of criteria for promotions and permanent appointments;		
Recommended Action(s)		**Responsibility**	**Target Date**
Dean Strategy planning to comment.			

Action No. 20	**Gap identified:** Introduce system of sabbatical leave (especially international) to enhance research; Arrange visit to Trinity of senior and suitably experienced technical staff, for observation, training (for appropriate duration) and to help develop meaningful research links; Put in place mechanisms and provide resources for supporting research and international collaboration; and Put in place mechanisms to enable greater industry involvement in research.		
Recommended Action(s)		**Responsibility**	**Target Date**
Agreed. DOCA to comment			

ACTION PLAN - Academic Review of four departments (Electronics & Communication Engineering)

Action No. 1	**Gap identified:**Encourage research collaborations between different laboratories in the Department, and also with laboratories in other Departments and Schools.		
Recommended Action(s)		**Responsibility**	**Target Date**
We are already on this path of encouraging lab collaborations in the university. For this purpose, we will identify the labs in Electrical, physics and Computer Science department where this type of collaboration can take place		HECED	15 May, 2016
Action No. 2	**Gap identified:**Form smaller panels for assessing the seminar on the masters programmes, minor project and dissertation. Each member of the panel should have the appropriate expertise in the subject being examined.		
Recommended Action(s)		**Responsibility**	**Target Date**
It has already been understood and implemented		HECED PG coordinator UG coordinator	30.4.2016
Action No. 3	**Gap identified:** Set up a sabbatical programme. This will foster collaborations with national and international research groups, and will enable Thapar to develop its research profile and output.		
Recommended Action(s)		**Responsibility**	**Target Date**
This gap can be bridged at the university level and therefore I would request the management of TU to look into this matter			
Action No. 4	**Gap identified:** Financial support for PhD students should not be discontinued if students are required to spend time in another university as part of their research programme.		
Recommended Action(s)		**Responsibility**	**Target Date**
Again this gap is related to university policy.			
Action No. 5	**Gap identified:** The administrative support in the Department should be increased. Faculty are spending too much time performing administrative tasks and this is having a negative impact on the time they can devote to research.		
Recommended Action(s)		**Responsibility**	**Target Date**
I think by the introduction of a new workload model, this gap can be bridged because the research active faculty members will get more time for research.		HECED And Workload model committee	30.6.2016
Action No. 6	**Gap identified:** Annual review of both equipment and software requirements for the teaching laboratories is recommended. Furthermore, all outstanding equipment purchases from the last review should be completed.		
Recommended Action(s)		**Responsibility**	**Target Date**
We will do the annual review of hardware and software requirements in the department		HECED	15.5.2016
Action No. 7	**Gap identified:** Adequate provision needs to be provided for the maintenance of teaching and research equipment		
Recommended Action(s)		**Responsibility**	**Target Date**
We will very carefully implement the suggested improvement.		HECED	15.5.2016
Action No. 8	**Gap identified:** A starting package should be provided to new junior academic staff to support them establishing their research activity, i.e. funding for one or two PhD students and travel grants to attend at least one national and one international conference per year should be provided		

Recommended Action(s)		Responsibility	Target Date
This gap pertains to university policy		Dean Resource Mobilization & Planning and the Associate Dean	
Action No. 9	**Gap identified:** The ratio of senior to junior academic staff is very low. A hiring and/or promotions campaign of senior qualified academics is suggested so that the ratio can be more balanced.		
Recommended Action(s)		**Responsibility**	**Target Date**
HECED will take a serious view of this gap and discuss the matter with DOFA so that in the subsequent faculty interviews some senior people can be recruited.		HECED	30.5.2016
Action No. 10	**Gap identified:** The development of the concept of academic freedom is essential for the development of research at Thapar. Lack of autonomy at all levels is blocking the contemporization process (difficult to modify course content, delivery style, without elaborate committee procedures, student feedback should be referred as a guideline for development). Devolution of responsibility to the senior staff in the Schools is required to create strategies, budgets etc. which would then go to highest level for approval. Staff development and sabbatical programmes needs to be developed.		
Recommended Action(s)		**Responsibility**	**Target Date**
This gap is related to university policy			
Action No. 11	**Gap identified:** Students are not sufficiently challenged at masters level in particular. This could be done by reduced delivery hours with more focused content and self-directed learning (e.g. less low level support for assignment work)		
Recommended Action(s)		**Responsibility**	**Target Date**
This is due to the new teaching load allocation policy adopted in this semester wherein the most junior faculty will get the first choice of subject. The junior faculty chose master level subjects because of the lesser number of students. No senior faculty members are teaching master level subjects. But from now onwards, there should be judicious approach for subject distribution.		HECED	30.6.2016
Action No. 12	**Gap identified:** Industry collaboration is weak. There is no clear research benefit from the contacts through the BTech internship programme. This is vital in order to ensure that students are engaging in project work of relevance, and to enable more direct funding opportunities.		
Recommended Action(s)		**Responsibility**	**Target Date**
A special care will be talked to fill this gap		HECED	30.6.2016
30Action No. 13	**Gap identified:** PhD students require individual desk space at a minimum. The PhD fee structure needs to be reviewed. The ongoing impact of the internal scholarship initiatives needs monitoring whilst avoiding generating uncertainty amongst the students themselves. Students must be actively encouraged and enabled to communicate amongst themselves to help nurture generic groups and collaboration (including interdisciplinary collaboration). Continuation of publicity/posters on research projects is very worthwhile for both internal and external consumption.		
Recommended Action(s)		**Responsibility**	**Target Date**
This gap is well understood and corrective action will be taken at the department level.		HECED	30.6.2016
Action No. 14	**Gap identified:** Development of a state of the art WIFI/IT system could have huge impact from many viewpoints: directly improving research capability; interaction with online libraries; and		

	development of a high tech reputation for the University.		
Recommended Action(s)		**Responsibility**	**Target Date**
This is related to university policy of Wi-Fi and internet.			
Action No. 15	**Gap identified:** A career structure must be developed for technical support staff. The number of regular staff who have the potential to take on responsibilities or provide any leadership is totally inadequate for a research led university. The present contract/regular ratios must be reviewed. The development of a career structure with proper benefits and with continuous professional development is essential.		
Recommended Action(s)		**Responsibility**	**Target Date**
Again this pertains to university policy.			

ACTION PLAN - Academic Review of four departments (Mechanical Engineering)

Action No. 1	**Gap identified:** It would be good to see strong evidence of achievement-based promotion based primarily on merit, rather than solely on seniority, to address the deficient senior: junior ratios. In general, staff over five years as assistant professor should be considered eligible for review. Apart from encouraging the successful individuals, it will set clear markers for other aspiring colleagues as well.		
Recommended Action(s)		**Responsibility**	**Target Date**
Policy issue		DOFA	
Action No. 2	**Gap identified:** A sabbatical programme should be put in place (with a strengthened emphasis on quality of the proposal balanced against seniority considerations).		
Recommended Action(s)		**Responsibility**	**Target Date**
Provision of sabbatical is there. Some faculty have already availed		DOFA	
Action No. 3	**Gap identified:** It is important that senior research-active staff are given relief from administration duties periodically and we note that there is a possibility of this in the rotation of department headship. In selecting new candidates, due consideration should be given to those with research excellence, those with outstanding teaching records and a track record of contribution to and vision for development.		
Recommended Action(s)		**Responsibility**	**Target Date**
Yes		HMED	Immediate
Action No. 4	**Gap identified:** A career structure must be developed for technical support staff. There should be an increase in the number of regular staff (as opposed to contract staff) is required. The development of a career structure with proper benefits and with continuous professional development is essential here also.		
Recommended Action(s)		**Responsibility**	**Target Date**
As per Annexure I		Registrar, OSD	
Action No. 5	**Gap identified:** The use of instrument specific software (e.g. Lab View) needs to be broadened out to undergraduate equipment. The introduction of specialist instrumentation software such as LAB view or Scada for the remote monitoring and control of the undergraduate teaching laboratory equipment would be of great benefit in augmenting the skills of the students.		
Recommended Action(s)		**Responsibility**	**Target Date**
P.O has been raised for lab view/MATLAB and DAQ software		Dr. A.Singla, HMED	30.05.16
Action No. 6	**Gap identified:** Consider the creation of a new Mechatronics lab to accommodate the newly purchased electro pneumatic equipment and PLC training units/ This will facilitate upgrading of instrumentation		
Recommended Action(s)		**Responsibility**	**Target Date**
Agree		Dr. A.Singla,	

		HMED	15.07. 2016
Action No. 7	**Gap identified:** Access to dedicated machine tools and equipment in the central workshop to support the emerging research activities should be made available. A specialist Technical Officer with both design and manufacturing experience and qualifications should be assigned in this area		
Recommended Action(s)		**Responsibility**	**Target Date**
Appointment of trained person		Head workshop and HMED	July, 2016
Action No. 8	**Gap identified:** PhD students showed concern over the fee level and the general structure of the scholarships and conditions. It is positive that a scholarship scheme has been introduced, but this needs continuous and sensitive review (to ensure that it doesn't cause uncertainty within the students).		
Recommended Action(s)		**Responsibility** DoRSP	**Target Date**
Action No. 9	**Gap identified:** There is a concern about the lack of office accommodation for PhD students. It is essential that each student has at least a personalised desk and some storage. (General use of the library does not address this.)		
Recommended Action(s)		**Responsibility**	**Target Date**
Requirement has been sent to Mr Nigam.		HMED& Mr . Summet Sharma (Department upkeep incharge)	31.12.16
Action No. 10	**Gap identified:** Industry involvement on the whole is not very visible. It is unfortunate that the department does not seem to be getting much back from the internships offered as part of their BE programme, given that the standard of the students is excellent. The review of this internship programme in the medium term should reflect this issue. In particular, encouragement of internships that have a more direct R&D element.		
Recommended Action(s)		**Responsibility**	**Target Date**
Encourage students to publish work carried with industry.		HMED Project semester co-ordinators	
Action No. 11	**Gap identified:** Lack of autonomy at all levels is blocking the contemporisation process. (It is difficult to modify course content, delivery style, without elaborate committee procedures, student feedback should be referred as a guideline for development) Devolution of responsibility to the senior staff in the Schools is required to create strategies, budgets etc., which would then just go to highest level for approval.		
Recommended Action(s)		**Responsibility**	**Target Date**
Feedback of student's representatives in DPPC will be mostly used for improvement.		HMED, DOCA	Immediate
Action No. 12	**Gap identified:** Reduction of previous recommendations to piece-meal action items delivered in top down approach has led to unintended consequences (These include an actual increase in staff loading and total loss of senior staff in teaching of some courses. Adoption of Trinity harmonized projects is further reducing faculty time in the absence of higher skilled technical staff)		
Recommended Action(s)		**Responsibility**	**Target Date**
Workload model will take care of these issues. DPPC should be the final authority.		HMED, DOCA	July, 2016
Action No. 13	**Gap identified:** Students are not sufficiently challenged at Masters level in particular. This could be done by reduced delivery hours with more focused content and self-directed learning (and less low- level support for assignment work)		
Recommended Action(s)		**Responsibility**	**Target Date**
All schemes/curriculum is being revised. Numerical and simulation based ME dissertations will be encouraged.		HMED	Immediate

Action No. 14	**Gap identified:** Development of a state of the art WiFi/IT system could have huge impact from many viewpoints, including interaction with online libraries, direct improvement of research capability and development of a high tech reputation for the university		
Recommended Action(s)		**Responsibility**	**Target Date**
To improve Wifi particularly in D block.		HCITM	July, 2016
Action No. 15	**Gap identified:** Manual lathes and milling machines could be retrofitted to include digital read-outs (DRO) and have coolant systems to include splash trays installed at relative low-cost.		
Recommended Action(s)		**Responsibility**	**Target Date**
To be incorporated wherever necessary		HCW	August 2016
Action No. 16	**Gap identified:** There is a lack of guarding around machines which can be remedied by use of safety shields on magnetic bases. Industrial gas bottles in the welding shop are not correctly restrained; they should be secured by means of either chains or straps to the wall or to benches to avoid being accidently toppled over. Quite noticeable was many of the students were wearing opened toed footwear. It would be preferable if steel capped footwear is worn by all in the workshops. Alternatively steel capped over-shoes could be supplied to students which they can place over their shoes or trainers.		
Recommended Action(s)		**Responsibility**	**Target Date**
Footwear shall be ensured.		HCW	July,2016
Action No. 17	**Gap identified:** The establishment of a career structure for the technical staff to include the introduction of a suitably qualified Chief/Head Technical Officer who could administer the technical resources of the department would greatly enhance the department research activities.		
Recommended Action(s)		**Responsibility**	**Target Date**
Policy to be framed.		HCW HMED REGISTRAR	DEC 2016
Action No. 18	**Gap identified:** Lab technicians with qualifications and skills at a level substantially above what is normally required be aligned as "specialist technical officers" with the emerging research groups within the department. They should carry out this function along with their regular duties. A special allowance or premium should be afforded to them in their salary to acknowledge their extra efforts and responsibilities. Research groups should be encouraged to factor in the cost of specialist technical services when applying for research funding.		
Recommended Action(s)		**Responsibility**	**Target Date**
Agree. Posts shall be created.		REGISTRAR DOCA HMED	

ACTION PLAN - Academic Review of four departments (School of Mathematics)

Action No. 1	Gap identified: There is a significant bureaucratic process underpinning all aspects of the programmes offered including course design and content as well as an increased administrative burden that has arisen from the implementation of learning and Programme outcomes.		
Recommended Action(s) Faculty of every level should be involved in the designing of course curriculum. School's autonomy should be increased in the course and programme design. **To reduce the administrative burden on the faculty the following points should be considered:** 1) A senior clerk should be assigned to assist and help the HSOM 2) An additional clerk (with solid background in Computer and data handling) should be recruited to assist the faculty. 3) Number of Teaching Assistantships in our school should be increased. Currently we have more than 20 regular research scholars in our school and only 4 are getting TA ship (reason being, as per directions from DRSP the Teaching Assistants should be given individual load. They cannot be given shared load even for laboratory classes). So we should give more teaching assistantships to regular research scholars of our school (at least 10) as it will not only reduce the teaching load of faculty but also the academic load (like paper evaluation, data entry etc.). Also there should not be any restriction of giving shared load to teaching assistants at least in case of laboratory classes.	**Responsibility** HSOM DOAA DRSP	**Target Date** June 2016	
Action No. 2	**Gap identified:** The level of the M.Sc. courses is lower than the same qualification at Trinity as well as at some other Indian universities (as observed by local staff).		
Recommended Action(s) Since the board of study of this school includes the eminent faculty from IIT's and reputed universities, so our MSc (Mathematics and Computing) programme and courses are in accordance with syllabus of UGC and IITs. Further, our M.Sc. program cannot be compared with the M.Sc.(High Performance Computing) which is running at TCD, Ireland as both are completely different programs. However, school will incorporate any concrete suggestions if TCD provides us.	**Responsibility** HSOM and DOAA	**Target Date** Next BOS meeting	
Action No. 3	**Gap identified:** There is little career advice or industry recruitment, at School or University level, focusing on new career opportunities in Mathematics and Computing, beyond the traditional teaching and Ph.D. route. Some focus here could lead to a new cohort of students interested in a career in industry, finance or management.		
Recommended Action(s) Common counsellor for the sciences (Mathematics, Physics and Chemistry) and humanities from CILP should be appointed for better interaction between the industry and the Schools. He/she will help in providing proper information, counselling and training to our students for getting jobs in industry, finance and management.	**Responsibility** CILP/HSOM/HSBC/SBSC	**Target Date** June 2016	

Action No. 4	**Gap identified:** Students could be challenged with more advanced modules with content at level of similar programmes at IITs;		
Recommended Action(s)		**Responsibility**	**Target Date**
School will follow the recommendation while constituting the committee as discussed in point No. 2.		DOAA/HSOM	June 2016
Action No. 5	**Gap identified:** There was little evidence of online resources, course webpages etc., which would benefit students and help to reduce administrative burdens on staff for UG teaching. We noted that course examination papers tended to include questions, or parts of questions, covering all material in the course rather than selecting a topic to probe in depth		
Recommended Action(s)		**Responsibility**	**Target Date**
The School has already developed web pages for its all UG courses which are given below.We are also in process to develop webpage of our M.Sc. program. Required involvement of CITM STAFF TO HELP FACULTY TO CONTROL WEB Pages. UMA003/UMA001 webpage: https://sites.google.com/a/thapar.edu/uma003/home UMA004/UMA002 webpage: https://sites.google.com/a/thapar.edu/uma004/ UMA032 Numerical Methods https://sites.google.com/site/nummaths/ UMA031 Optimization Techniques https://sites.google.com/site/ot/ However, regarding online resources concerned course coordinators would be advised to upload or give information regarding the online resources on web page of their courses. For this, the involvement of CITM staff is required so that faculty members can develop and modify the webpages of various other courses. As per institutional policy and usual practice the examination papers tend to include questions from entire syllabus of a course. In addition, the question papers of UG courses are already being reviewed by external agency (TCD). However, we also recommend that the faculty should be advised to include at least 10 - 15% questions in the exam that covers some topics in depth.		Course Coordinators of concerned courses/HCITM / HSOM	August 2016
Action No. 6	**Gap identified:** Consider adding courses already taught to other PG programmes to the electives.		
Recommended Action(s)		**Responsibility**	**Target Date**
This point will also be considered by the members of the concerned BOS committee as constituted in point No 2.		HSOM/ DOAA	Next BOS meeting
Action No. 7	**Gap identified:** All staff, including at Assistant Professor level, should have individual offices to enable appropriate research and interaction with PG and UG students as well as a good atmosphere for research. The School needs a common area where staff can meet informally to promote collaboration and communication within the School.		
Recommended Action(s)		**Responsibility**	**Target Date**
Currently, only nine faculty members out of twenty three have individual sitting office whereas remaining fourteen faculty members are sharing their offices. So, we strongly recommend to provide at least 9 more rooms (considering total faculty to be 25) to our school so that remaining and new faculty members (to be appointed) can have their individual offices. We strongly recommend to develop a common area where		Chairman Space Committee/ HSoM	June 2016

	staff can meet informally to promote collaboration and communication within the school.		
Action No. 8	**Gap identified:** The skewed senior: junior ratio places considerable responsibility on senior staff to mentor and support new staff. In addition, there are only a few faculty to assume leadership roles and the School needs to take care to consider the views of all its staff in any decision-making.		
Recommended Action(s) The skewed senior: junior ratio is due to rigid promotion policies of the institute that usually do not encourage the promotions at lower level. We recommend that these promotion policies should be framed in such a way that they should favour the teaching experience of the faculty in the institute (as done in central universities and IITs). However, anyone who is outstanding and active candidate (in terms of teaching/research at the level of Assistant/Associate Professor) can be promoted irrespective of his experience.		**Responsibility** DOFA/ Associate Dean/ HSOM	**Target Date** June 2016
Action No. 9	Gap identified: We found significant dissatisfaction, amongst some staff, with their prospects for promotion and sabbatical. This is a result of University requirements for promotion that impose common metrics across all disciplines. This can be detrimental for mathematicians whose rate of publication and grant income differ significantly from the sciences and engineering.		
Recommended Action(s) In para 9.5.2 on page 70, TCD has already given recommendations for this gap. In addition to that we also recommend the following: There should be separate criteria for promotions in the field of Mathematics. As faculty members of mathematics don't need major equipment for research purpose, therefore their projects have always less amount as compare to other applied sciences and engineering. So, we recommend separate criteria of major and minor projects in the field of mathematics. Even very good SCI/ SCIE mathematical journals have less impact factors therefore can't be compared with the journals of other applied sciences and engineering. So, it is recommended to frame a separate promotion policy for Mathematics faculty.		**Responsibility** Director/DOFA/DRSP	**Target Date** June 2016
Action No. 10	**Gap identified:** At University level develop a Research Office with staff who have the expertise to help write successful grant proposals, review proposals in preparation, actively engage with School staff to investigate new funding opportunities;		
Recommended Action(s) The school recommends that the university should setup a Research Office with different expertize from every field. Although, this action point is not a gap rather a recommendations given by TCD (see para 9.5.2)		**Responsibility** DRSP	**Target Date** August 2016
Action No. 11	**Gap identified:** The School should be more involved in the recruitment and decision-making for new hires with input all the way through the process to the final decision. Any additional new staff should not increase the number of courses on offer, but decrease current teaching load.		

Recommended Action(s)	Responsibility	Target Date
Currently, all the faculty members are involved in the process of recruitment as the faculty members provide their feedback at the time of presentation of new candidates. The school will provide the areas in which the new recruitment should be made. Further the school will try to reduce the teaching load if the competent authorities directs the School for the same. For this purpose, the school recommends that more new recruitments should be made in the school.	DOFA/DOAA/HSOM	June 2016

Action No. 12	**Gap identified:** The reviewers recommend the new organization structure (currently at design stage) should ensure that there is a contact point between the central university administration and the Departments (or Schools within a new Faculty organization). The new organization structure should ensure that the contact point is appropriately staffed and resourced to effectively manage the data collection and input of student data from service teaching on the undergraduate Engineering degrees. This would relieve the administrative workload of the academic staff within Schools and enable them to focus on research and teaching.

Recommended Action(s)	Responsibility	Target Date
The School feels that the faculty devote a lot of time for the data collection and compilation. The school recommends that the faculty members should be provided TA's or the school should be provided with additional supporting staff so that the additional workload on the faculty should be reduced in order to enable them to focus on research and teaching. Further, various reports and lot of non-teaching work is done by teaching staff, therefore we recommend to recruit new support staff for these purposes and to set up a new office of professionals at university level which should be responsible for these issues.	Registrar/DOFA/ DOAA/ DRSP/HSoM	July 2016

Action No. 13	**Gap identified:** Reduce teaching loads to increase research output by hiring additional staff and streamlining current course offerings; Reconsider the strictly-enforced allocation of teaching loads;

Recommended Action(s)	Responsibility	Target Date
The school will try to reduce the teaching load if the competent authorities directs the School for the same. For this purpose, the school recommends that more new recruitments should be made in the school so that the teaching load on the faculty members can be reduced in order to enable the faculty to devote more time to increase the research output. Further, the School strongly recommends to provide Teaching Assistantship to every Ph.D. student to reduce teaching load (tutorial and labs). If it is properly advertised, talented and efficient Ph.D. students will be enrolled in the school	DOAA/DOFA/DORSP	**June 2016**

Action No. 14	**Gap identified:** Recruit additional administrative staff within the School to remove rote administration from academic staff

Recommended Action(s)	Responsibility	Target Date
Yes, the School strongly recommends that two more additional administrative support staff should be provided to the school. The same has been suggested by TCD (see page 72)	Registrar/ OSD	June 2016

Action No. 15	**Gap identified:** Allow for PhD students and postdocs to mark student homework and exams (with appropriate oversight).

Recommended Action(s)	Responsibility	Target Date
This matter is related to DOAA office. We follow a uniform policy at university level.	DOAA/ HSOM	June 2016

Action No. 16	**Gap identified:** Junior faculty in particular appear demoralised by the lack of promotion or sabbatical prospects that result from the application of common metrics across all disciplines – this disadvantages mathematics in particular where publication rates and grant income are typically, by all international norms, much lower than in the sciences and engineering.

Recommended Action(s)	Responsibility	Target Date
As mentioned in Action point No. 8 & 9, university needs to revise promotion policy, particularly for Mathematics faculty keeping in view their expertise and experiences. Faculty should be motivated for higher studies (Post-Doctorate) and sabbatical leaves should be granted.	DIRECTOR./DOFA	May 2016

Action No. 17	**Gap identified:** There is little international collaboration or travel to international conferences or workshops. Once again this is, at least in part, a result of the onerous teaching and administration and especially the requirement that each faculty have delivered a set amount of contact teaching hours.

Recommended Action(s)	Responsibility	Target Date
1. Teaching and administrative work load of faculty should be reduced. 2. Faculty should be motivated to take research scholars in collaboration with other National/International researchers 3. International conferences/workshops should be funded by Thapar University. 4. The amount provided by University to attend international conferences is not sufficient. It is recommended to provide at least actual air fare for attending the international conferences.	DOFA/ DRSP	June 2016

Action No. 18	**Gap identified:** The University should fund more postdocs to reach critical mass in research areas and allow more rapid progress given the high teaching loads; The School should instigate a research seminar delivered at the cutting-edge level. The University and School should allow new staff to have a start-up period with decreased teaching load;

Recommended Action(s)	Responsibility	Target Date
The School is already organising lecturers, seminars time to time by eminent outside faculty on emerging area of mathematics. However, this action point is again not a gap rather, recommendation of TCD (see page on 9.7.1 at page 72).	DOFA/ DRSP/HSoM	Hune 2016

Action No. 19	**Gap identified:** Trinity and Thapar Schools should explore areas of research overlap and encourage research visits and possible dual supervision of PhD students if appropriate.

Recommended Action(s)	Responsibility	Target

		DOPA/ HSOM/ DRSP	**Date**
University should create a platform for the interaction of faculty of the school of mathematics and Trinity college, so that common areas of interest can be explored. For dual supervision of PhD students appropriate guidelines should be framed.			June 2016

Action No. 20	**Gap identified:** The School should develop a coherent and specific strategic plan that aligns with the University's goals;		
Recommended Action(s)		**Responsibility**	**Target Date**
The school has already prepared a strategic plan for five and ten years that align with the university's goal and submitted to the competent authority.		Associate Dean /HSoM	June 2016

Action No. 21	**Gap identified:** A portion of research overheads should come, in a transparent way, to the School for their use to support a research strategy;		
Recommended Action(s)		**Responsibility**	**Target Date**
It is recommended that the school should be empowered to use a portion of research overhead to support in implementing the research strategy of school.		DRSP/ Associate Dean	June 2016

Action No. 22	**Gap identified:** The University should grant more autonomy to the Schools for strategic decision making in teaching and research.		
Recommended Action(s)		**Responsibility** DIRECTOR/DOFA/ DOAA/DORSP	**Target Date**
The school strongly recommends that the university grants more autonomy to the school for taking strategic decision in teaching and research.			June 2016

ACTION PLAN - Academic Review of four departments (School of Chemistry and Biochemistry)

<table>
<tr>
<td>Action No. 1</td>
<td colspan="3"><u>Gap identified:</u> The School needs to generate a strategic plan and to make decisions that aligned with its objective and based on a business model. The School has determined that it wants to promote and grow its M.Sc. in Chemistry, a decision which the review panel endorses.</td>
</tr>
<tr>
<td colspan="2"><u>Recommended Action(s)</u>
A core committee of senior faculty members will be formed to draft a strategic plan for the school. The plan based on the business model shall be organized with objectives of the school. Strengthening and expansion of MSc in Chemistry/ Biochemistry should be the core form of expansion plan.</td>
<td><u>Responsibility</u>

HSCBC & Chairman of the core Committee</td>
<td><u>Target Date</u>
May 31st 2016</td>
</tr>
<tr>
<td>Action No. 2</td>
<td colspan="3"><u>Gap identified:</u> The School has created a student Society for Chemistry and Research Education (CARE) the review panel is not convinced that this is sufficiently active e.g. the M.Sc. students they met were unaware of it or its role in the School. Increase support for local student societies, networking, and career planning at postgraduate level by assigning an academic staff member with responsibility for prioritizing the aims and actions of the CARE programme.</td>
</tr>
<tr>
<td colspan="2"><u>Recommended Action(s)</u>
President of CARE should reply the concerns to the TCD reviewer panel.
  1) President should make the society more vibrant and student centered.
  2) List of activities to be conducted in an academic year should be made and to be shared with Faculties, research scholar and students of SCBC.
  3) Care should include representatives from all these domains.</td>
<td><u>Responsibility</u>

President of CARE</td>
<td><u>Target Date</u>
April 30th 2016</td>
</tr>
<tr>
<td>Action No. 3</td>
<td colspan="3"><u>Gap identified:</u> Take appropriate steps to enhance the international outlook of School e.g. establish program specific workshops and high-visibility seminar series that have a high-level of international participation (this activity could be spearheaded by visiting academics and TCD mentors).</td>
</tr>
<tr>
<td colspan="2"><u>Recommended Action(s)</u>
Coordinator for seminars / symposia / workshop to be coordinated to recommended plans for following points;
  1) To plan an international event in specific focus area of chemistry/ Biochemistry once in every 3 years and national event once in every 2 years.
  2) To plan national workshop on specialized areas of research and discuss latest</td>
<td><u>Responsibility</u>

HSCBC</td>
<td><u>Target Date</u>

June 30th 2016</td>
</tr>
<tr>
<td>Action No. 4</td>
<td colspan="3"><u>Gap identified:</u> Both the Ph.D. and M.Sc. programmes as they stand do not give students sufficient exposure to cutting–edge research techniques</td>
</tr>
<tr>
<td colspan="2"><u>Recommended Action(s)</u>
  1) Faculty members to be sensitized for incorporating in their research the application of cutting edge research tools like HRTEM, HRSEM, etc discussed in the faculty meeting how to improve the quality.
  2) To coordinate with SPMS, CHED, BTD, SEE and draft a proposal for ……………………………… HEE on the campus.</td>
<td><u>Responsibility</u>

HSCBC & DD-II</td>
<td><u>Target Date</u>

June 30th 2016</td>
</tr>
<tr>
<td>Action No. 5</td>
<td colspan="3"><u>Gap identified:</u>
Establish an in-house, international master-class program on instrumentation</td>
</tr>
</table>

	techniques and applications, for taught courses at the PG level (e.g. by utilization of TCD mentoring/collaborating staff)		
Recommended Action(s) To establish a new international post graduate diploma programme on Instrumental techniques and applications in collaboration with TCD. Since there is already a full course on analytical chemistry PCY101 taught in SEM-I of MSc programme, the programme objectives of which are to provide knowledge and training to the PG students on the instrumental techniques like ICP, AAS, HPLC, GC, CV, DPV etc.		**Responsibility** HSCBC & Time table coordinator	**Target Date** May 30th 2016
Action No. 6	**Gap identified:** Replace the currently open physical chemistry academic position and add two new academic posts at assistant professor level. This is to reduce the teaching burden on existing staff, increase the research profile of the School and ensures that each one of the new themed research clusters in the School reach critical mass (The proposed themes are Molecular Sensing and the Environment, Synthetic and Medicinal Chemistry, Catalysis and Nano-chemistry). The increase in academic personnel must be accompanied by appropriate additional space, equipment and start-up support.		
Recommended Action(s) As per teaching load prepared for the session 2016 -17, 43 hours of teaching load is excess of normal load .As Dr. Rajesh Kumar having physical chemistry specialization has resigned and also since 4 -5 physical chemistry courses have to be taught from next semester, the school is in urgent need of two Assistant Professor faculties specializing in Physical Chemistry, for smooth conducting of course distribution in next semester.		**Responsibility** DOFA/Director	**Target Date** July 31st 2016
Action No. 7	**Gap identified:** Appoint two qualified technical officers as a matter of urgency in the teaching laboratories. Appoint one additional clerical officer immediately to handle student data, marking lists, and other administrative duties associated with all taught courses and to liaise with the newly created science course and research officers.		
Recommended Action(s) Given around 800 students, 90 -96 hours per week teaching, following manpower is required in the school on urgent basis 04 Technically qualified lab attendants for taking UG/PG Lab classes. 01 Lab technician for ensuring smooth running of lab equipments and also for the maintenance, upkeep and repair of the same 01 office staff.		**Responsibility** Registrar	**Target Date** 15th April 2016
Action No. 8	**Gap identified:** Include the School in decisions relating to the advertisement of all new posts. At academic level steps should be taken to make the advertisements geographically far-reaching and international. The aim being to broaden the catchment area from which applications are drawn. Senior academics in the School should be responsible for devising the short-listing criteria.		
Recommended Action(s) Agreed with the TCD review panel suggestions.		**Responsibility** Dean Resource Mobilization & Planning and the Associate Dean,	**Target Date**

		DOFA and HSCBC	

Action No. 9	**Gap identified:** Establish a sabbatical leave system, perhaps started by a Trinity-Thapar faculty exchange system for academic staff.		

Recommended Action(s)		**Responsibility**	**Target Date**
It is essential to establish and make provisions for sabbatical for the faculty and request to be accepted liberally supported with recruitment of substitute faculty on fixed tenure basis.		Registrar & DOFA	

Action No. 10	**Gap identified:** Each academic staff member should generate their own individual research plan which is discussed annually with senior staff in the School. These should provide targets and strategies for funding applications, group development and equipment and space needs.		

Recommended Action(s)		**Responsibility**	**Target Date**
As per discussion with TCD, three broad area of research have been identified in chemistry as follows: 1.Catalysis & Nanochemistry 2.Synthesis & Medicinal Chemistry 3.Sensing & Environment Chemistry All faculty members are working in these three areas. Each individual faculty member is required to write his/her research target in the format of PIS (Performance incentive scheme).		DoFA/ DoRSP	

Action No. 11	**Gap identified:** Significantly decrease teaching load for all levels, but especially for assistant professors. New academic hires should have decreased teaching and admin loads in the first three years (without penalty and no negative impact on promotions).		

Recommended Action(s)		**Responsibility**	**Target Date**
As per this, faculty is needed on urgent basis to reduce the teaching load as also discussed in Action taken No.6		DoFA/ DoAA	

Action No. 12	**Gap identified:** Devise a mechanism to capture the workload of academic staff and use the data to develop a School specific workload document for the equitable distribution of School activities.		

Recommended Action(s)		**Responsibility**	**Target Date**
Faculty is of the opinion that workload of Junior Faculty to be reduced by 3 -4 hours to make them more research active/focused.		DOCA	As finalized by TU

Action No. 13	**Gap identified:** Adopt a more problem oriented and outcome-based approach in teaching. Include more practical applications and research-based experiments. Include problem solving and data analysis in the teaching courses.		

Recommended Action(s)		**Responsibility**	**Target Date**
As per TCD recommendation, SCBC are moving toward outcome based approach in teaching. Efforts will be taken to incorporate the above points.		HSCBC/ Instructor/ Course coordinators	July 2017

Action No. 14	**Gap identified:** Ensure the learning outcomes have been achieved at School level via student consultation at the end of each semester.		
Recommended Action(s) The process has already been started from current semester for PG students.		**Responsibility** HSCBC/ Instructor/ Course coordinators	**Target Date** July 2017
Action No. 15	**Gap identified:** Modernise the content of laboratory teaching giving particular attention to the inclusion of spectroscopic techniques Priorities the modernization of postgraduate laboratory teaching. Adopt a supervised group marking session for Engineering undergraduate lab reports using postgraduate students/teaching assistants. This should reduce the administrative workload of academic staff significantly.		
Recommended Action(s) SCBC need to purchase lab equipment on urgent basis to improve teaching quality as discussed in action point no.		**Responsibility** HSCBC	**Target Date** July 2016
Action No. 16	**Gap identified:** Reassess course content with regard to its overlap with undergraduate courses (remove material) and implement a lecture: interactive tutorial ratio of 4:1.		
Recommended Action(s) All courses will be evaluated to remove any overlap with UG course contents. In PG courses tutorial classes may be introduced on BOS/senate approval.		**Responsibility** HSCBC	**Target Date** December, 2016
Action No. 17	**Gap identified:** Marking of exams must differentiate between different levels of ability in the student cohort. They should be incremental and allow discrimination between memory, understanding and the application of taught material. Each question should be sufficiently comprehensive to address all levels, e.g., parts of a question should be set to a minimum of five marks.		
Recommended Action(s) More conceptual question will be included in MST and EST question papers to address the issue.		**Responsibility** Respective course coordinators	**Target Date** December, 2016
Action No. 18	**Gap identified:** There should be a School examination board which should include at least one external member (a senior academic in Chemistry that is not from Thapar to assure quality control and appropriate bench marking.		
Recommended Action(s) Regarding above points decision has been taken and examination board is constituted at the University level. Regarding external examiner decision has to be taken by COE and DOAA.		**Responsibility** COE and DOAA.	**Target Date**
Action No. 19	**Gap identified:** The equipment is very basic for international standards. It is sufficient for teaching at the undergraduate level but not for more advanced		

	postgraduate studies. The equipment is reasonably well maintained but dated.

Recommended Action(s)	**Responsibility**	**Target Date**
In SCBC dedicated instrumentation facilities could be created housing the proposed equipment's viz. TEM (transmission electron microscope), surface XPS, high resolution mass spectrometry (HRMS), benchtop XRD, confocal microscopy, RAMAN spectrometer, dedicated computational chemistry facilities. This equipment are urgently required to improve the quality of ongoing research competing at the international standard. Moreover these equipment's will be used by other department as well. The above facilities will be catered to outside institute samples for revenue generation. To purchase proposed equipments TEM (transmission electron microscope), surface XPS, high resolution mass spectrometry (HRMS), benchtop XRD, confocal microscopy, RAMAN spectrometer estimated budget of Rs.15 Crores required.	Funds may be provided by TU under lab modernization budget: Dr. B. Pal Dr. A. Ali	December 2016

Action No. 20	**Gap identified:** Most of the current synthetic experiments are performed in the open-air and on the bench due to a lack of sufficient fume hood space. There is no equipment for modern undergraduate teaching e.g. rotary evaporators, benchtop spectrophotometers, melting point apparatus, column or water pumps, TLC plates, separating funnels, hot plate stirrers, or any advanced experimental techniques such as Schlenk lines, vacuum distillations, etc.

Recommended Action(s)	**Responsibility**	**Target Date** December 2016
The number of fume hoods in all the research and academic labs must be increased. Small laboratory equipment (hot plates, distillation set-ups, rotary evaporators, etc.) are required to increase and appropriate funds required must be provided from TU. Column or water pumps, TLC plates, separating funnels, hot plate stirrers, or any advanced experimental techniques such as Schlenk lines, vacuum distillations, etc. are also required additionally. Small Equipments for 2 UG + 2 PG Labs –= Rs.40 Lacs Catering 800 students. 10 Fume hoods – Rs.10 Lacs for synthetic research labs	Funds will be provided by TU SCBC Faculty: Dr. S. K. Pandey for procurement	

Action No. 21	**Gap identified:** The available safety equipment (first aid kits, location of safety showers, etc.) is of a totally inadequate standard. The reviewers would like to be sure that there is a safety induction lecture or other training that is vigorously enforced e.g. that safety forms part of each pre-practical talk and experiment, MSDS sheets, risk assessment forms.

Recommended Action(s)	**Responsibility**	**Target Date**
Regarding safety point of view SCBC required urgently skilled technician and even though we are following safety precautions but still need to be improve at the international standards.	Nominated by HSCBC	December 2016

Action No. 22	**Gap identified:** The number of fume hoods (approx. 2 per research group) is insufficient for synthetic chemistry groups. Likewise, the available small laboratory equipment (hot plates, distillation set-ups, rotary evaporators, etc.) is

	insufficient to sustain even current levels of work. Standard electrical equipment is outdated and often of dubious safety standards. The reviewers remain doubtful about the level of actual ongoing experimental work in the research laboratories.		
Recommended Action(s): Same as discussed in Action No.20		**Responsibility** Chairman Senate/ Director.	**Target Date** 1 year
Action No. 23	**Gap identified:** The number of allowable Ph.D./M.Sc. researchers per research group is limited to 8 (apparently per government regulations). This should be relaxed, e.g., in synthetic organic chemistry larger group sizes are mandatory to be internationally competitive.		
Recommended Action(s): The issue to be raised to research senate for making an agenda item for approval to Chairman senate.		**Responsibility** Chairman Senate/ Director.	**Target Date** 1 year
Action No. 24	**Gap identified:** There is a need for additional major *instrumental equipment* in the School. Items missing include: TEM (transmission electron microscope), surface XPS, high resolution mass spectrometry (HRMS), benchtop XRD, confocal microscopy, RAMAN spectrometer, dedicated computational chemistry facilities.		
Recommended Action(s) HSCBC to initiate this activity for raising the budget requirement, specification and budget to director for purchase.		**Responsibility** Director	**Target Date** 1 year
Action No. 25	**Gap identified:** There is an urgent need for access to SciFinder to enable literature searches in Library.		
Recommended Action(s) Librarian will be requested to raise the request for procurement of Scifinder.		**Responsibility** Librarian	**Target Date** 6 months.
Action No. 26	**Gap identified:** The reviewers are concerned that the SAI-based equipment is not utilized to its fullest potential by researchers in the School. There is no provision to train research group members in the direct use of the instruments (all of which are essential research career skills).		
Recommended Action(s) SAI – In charge will be approached to train the research group of SCBC to operate the sophisticated instruments.		**Responsibility** Prof. In charge SAI - lab	**Target Date** 6 months
Action No. 27	**Gap identified:** Provide write-up rooms that are separate from experimental laboratories for research students (where they are missing). Create a common, shared write-up room for PG students to foster collaboration.		
Recommended Action(s) Spacious and comfortable (30 x 20 ft) Sitting/Common room/ reading room/ library/ computer room required to be built in and around SCBC premises with the Director approval.		**Responsibility** Director	**Target Date** 1 year
Action No. 28	**Gap identified:** One postgraduate student and/or PI in each research theme should be trained in the use of the major instrumentation facilities		

	currently housed in the SAI centre. This will allow additional samples to be run without overburdening staff in the central instrument facility. Access and time allocation for the School-based researchers must be reassessed. Major instrumentation must be utilized 24/7. Sign-off for the utilization of central instrumentation must be at the P.I. level.		
Recommended Action(s) Once action pt-20 is accepted modality for students time allocation would be carried out in consultation with SAI labs.		**Responsibility** Prof. In charge SAI - lab	**Target Date** 6 (Action-26)+ 1 months
Action No. 29	**Gap identified:** Opportunities for industry interaction, interdisciplinary and collaborative projects must be implemented and strengthened e.g. by using existing service industry contracts to establish direct collaborations and international contacts, e.g. through participation in seminar programs, collaborative projects and the provision of research-led internships.		
Recommended Action(s) 1. Faculty will be encouraged to write collaborative projects with industrial partners. 2. Faculty will be encouraged to have international collaboration. 3. Expert lecture of Industrialist. 4. Frequent visits to industry.		**Responsibility** HSCBC	**Target Date** 2 years.
Action No. 30	**Gap identified:** Start-up funds for new academic assistant professors should include one 4 year PhD studentship.		
Recommended Action(s) Issue to be raised to research senate for making an agenda item for approval to chairman senate.		**Responsibility** Director	**Target Date** 1 year
Action No. 31	**Gap identified:** The School should establish a number of Thapar-supported 4 year international PhD studentships each year. The proposed number is 6 (at the rate of 2 per year for 3 years). These students should be required to spend a final fifth year in Thapar Chemistry during which they would complete and submit their thesis, write-up publications, pass on their knowledge of international research cultures to their home institution and act as human conduits for on-going connectivity, collaboration and discussion between the themed Thapar clusters and their Trinity research supervisor.		
Recommended Action(s) Issue to be raised to research senate for making an agenda item for approval to chairman senate.		**Responsibility** Director	**Target Date** 1 year
Action No. 32	**Gap identified:** Small laboratory equipment must be improved, outdated electrical equipment replaced and brought to modern safety standards. Synthetic laboratories must be equipped with more fume hoods, if necessary additional space must be provided for synthesis-oriented research.		
Recommended Action(s) a) HSCBC will raise the budgeting request for replacement of lab		**Responsibility** HSCBC/Directo	**Target Date** 1 year

equipment and to modernize the safety standards. b) Requirement for more fume hood and additional space will be raised. Estimated Costs UG/PG 4 Labs modernization and expansion = Rs.50 Lacs for Small Laboratory equipments purchase 10 Fume hoods x 1 Lab = Rs. 10 Lacs	r	

Action No. 33	**Gap identified:** Thapar must change to discipline specific promotion criteria (and should no longer use a fixed set of generic metrics).The School should take ownership of curriculum revision, course assignments, and staff workloads. Current School procedures are overly bureaucratic and based on a top-down approach and must be streamlined with all staff agreement.		
Recommended Action(s)		**Responsibility**	**Target Date**
1. Decision to be taken at university level. 2. Curriculum revision is being carried out by school and staff workload is per university. 3. All activities of the school are discussed in SPPC for their implementation.		HSCBC Director HSCBC	1 year
Action No. 34	**Gap identified:** The School must further focus its research into agreed themes or clusters (molecular sensing and the environment; synthetic and medicinal chemistry; catalysis and nanochemistry). This streaming must be fully integrated with the University's strategic research targets and business plan (staffing, infrastructure, teaching and research). Thapar must document its chemical/biological waste management procedures.		
Recommended Action(s)		**Responsibility**	**Target Date**
School agrees to these themes and HSCBC will take care for integration with university's strategic plans. Direction will be requested to constitute a committee for comprehensive guide lines for chemical /biological/ radioactive /waste management as per suggestions of TCD.		HSCBC	1 year

ACTION PLAN - Academic Review of four departments (School of Physics and Material Science)

<table>
<tr><td rowspan="2">Action No. 1</td><td colspan="3">Gap identified: Develop a strategic plan for research and teaching which addresses questions relating to opportunities open to SPMS as well as specific weaknesses. This should include plans for how equipment and staff resources necessary to achieve research and teaching goals can be funded.</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td colspan="2">Recommended Action(s)</td><td>Responsibility</td><td>Target Date</td></tr>
<tr><td colspan="2">A committee has been constituted under the chairmanship of Prof. Kulvir Singh, Associate Dean, strategy. The committee will frame a comprehensive strategic plan for research and teaching relevant to school.</td><td>Prof. Dr. Kulvir Singh</td><td>May 2016</td></tr>
<tr><td rowspan="2">Action No. 2</td><td colspan="3">Gap identified:
To increase the level of technical support available to academic staff. There has been a chronic lack of technical support in SPMS and this problem needs to be addressed urgently.
The reviewers recommend a level of technical support staff equivalent to one full time technician per teaching laboratory and one senior and junior technician dedicated to support of research equipment

A Senior Clerical Officer should be responsible for liaising with a proposed Faculty Office as well as carrying out administrative tasks as directed by the Head of School. The Senior Clerical Officer should be responsible for coordination of documentation arising from students registered on School specific programmes and its delegation to the Junior Clerical Officer. Progression from contract to permanent positions should be facilitated within a realistic time period e.g. three-five years.</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td colspan="2">Recommended Action(s)</td><td>Responsibility</td><td>Target Date</td></tr>
<tr><td colspan="2">As per the TCD recommendation there is a chronic lack of technical support staff in SPMS and the same needs to be addressed urgently. Following is the list of supporting staff required:

Scientific officers: 1
Lab Superintendents:1
Lab Technician: 3
Lab Attendant: 2

TCD review recommends that the process of progression from contract to permanent positions for the non-teaching support staff may be reviewed.</td><td>Director for kind consideration and approval. Registrar and HR department will execute the appointment process.</td><td></td></tr>
<tr><td rowspan="2">Action No. 3</td><td colspan="3">Gap identified: There is a concern about the balance between the amount of time devoted to lecture and laboratory classes and the relatively limited amount of time available for private study. The reviewers agree with both the staff and students that the ratio of time spent in class relative to private study time is too high.</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td colspan="2">Recommended Action(s):</td><td>Responsibility</td><td>Target Date</td></tr>
<tr><td colspan="2">The current MSc scheme is as per the UGC guideline. Which state that "the total periods provided for contact teaching shall not be less than 30 hours a week". And "the time provided for practical, field work, library, utilization of computer and other such facilities shall not be less than 10 hour a week". However any non-uniformity of the contact hours among the semester will be omitted in the upcoming BOS.</td><td>PG coordinator</td><td>July 2016</td></tr>
</table>

Action No. 4	**Gap identified:** Proposed BSc and BTech courses need to be considered carefully before deciding whether or not to embark on these new ventures. Academic staff are currently overstretched by teaching and administrative duties and this severely reduces time available for research. Since the Thapar contemporization process envisages a significant increase in research output, introducing these new degrees at this time may be counterproductive in achieving its aims.		
Recommended Action(s) :		**Responsibility**	**Target Date**
We agree with the recommendations of the TCD team that at this point of time introducing a new UG course will be counterproductive. School will focus on strengthening the existing programmes and the research to become a significant player at national level.		PG & Ph.D. Coordinator	June 2017
Action No. 5	**Gap identified:** MSc students are eager to participate in summer internship programmes, but are not sure how to go about obtaining a summer internship, either in India or abroad.		
Recommended Action(s) List of the mentors for the student		**Responsibility**	**Target Date**
The school has a policy to help the interested students as following: The PG coordinator prepares a list of mentors. Mentors guide and assist interested students for summer internship in consultation with the PG coordinator and the training and placement officer.		Respective Mentor/PG Coordinator/ Training and Placement Officer	May 2016
Action No. 6	**Gap identified:** Steps could be taken to increase the range from which MSc and PhD students are recruited. In the short term this will most likely include recruitment from other Indian states. In the longer term, international student recruitment can be targeted.		
Recommended Action(s)		**Responsibility**	**Target Date**
Efforts will be made to popularize these programmes by visiting some of the famous institutions and delivering talks by faculty members. In order to fetch international students, collaborative research programmes will be started.		HSPMS DoRSP	July 2017
Action No. 7	**Gap identified:** MSc and MTech students should be supported and encouraged to seek internship opportunities abroad or other international exchange programmes which will directly benefit their studies. PhD students should be encouraged to apply for funding which will allow them to travel abroad (in addition to within India). International exposure will assist them in finding postdoctoral opportunities, etc abroad.		
Recommended Action(s)		**Responsibility**	**Target Date**
We are already practicing the summer internship at national level. Efforts will be made to strengthen these further by advising the students for applying for such programmes. However, we need to develop an in-house policy to provide financial support for such foreign travels for PG and PhD students.		Director for kind consideration; DoRSP for implementation	
Action No. 8	**Gap identified:** No technical staff whose main responsibility is for research equipment and supporting research activity. There is a chronic and urgent need for recruitment of well-trained and qualified technical staff whose roles will be to offer additional support to laboratory class teaching and to support research.		

		Responsibility	Target Date
Recommended Action(s)			
As per action point-2.			
Action No. 9	**Gap identified:** The main issues raised by the associate professors related to administrative workload, professional development and travel allowances were not equitably distributed between academic staff at different levels of seniority. For example, assistant, associate and senior professors are entitled to 30,000, 40,000 and 70,000 INR per annum. There is no possibility of paid sabbatical leave. There was also uncertainty over promotion criteria which change over time.		
Recommended Action(s)		**Responsibility**	**Target Date**
The matter needs to be deliberated at the university level and frame appropriate policy to address these concerns.		Registrar	
Action No. 10	**Gap identified:** Limited industry interaction by senior SPMS academics in materials science		
Recommended Action(s)		**Responsibility**	**Target Date**
A core team headed by Prof. O. P. Pandey will work to improve the industrial interaction. Leaders from the industry will be invited for industry-academia interaction and faculty members will visit relevant industries to explore possible joint research collaboration. For these activities, necessary funds may be allocated.		Dr O. P. Pandey	July 2017
Action No. 11	**Gap identified:** International travel experience is important for academic staff and students from MSc level upwards, but especially for senior academic staff. It is recognized that finding funding for such travel is difficult, but it is essential to allow academic staff to establish international links for collaborations which might draw in funding and to give exposure to their research work at international conferences.		
Recommended Action(s)		**Responsibility**	**Target Date**
1. In India, there are a few agencies who sponsor international travel to attend a conference. Although such sponsorship is extremely competitive and available once in three years only, all faculty members should apply and attempt to avail the funds. SPMS will develop a mechanism to keep updates about the sponsoring agencies. 2. TU may develop the following policy: (i) Although TU provides PDA, but many times the amount is not sufficient. TUmay provide the balance amount for attending the event. (ii) Sponsor at least three faculty members on rotation basis in each academic year. Each faculty member must attend an international conference/ visit a lab for collaborative research abroad once in a five year slot. (iii) Senior faculties must be encouraged to spend considerable amount of time in a foreign lab for establishing research links and MOU at the university level. (iv) After returning back from a fully sponsored trip (by TU), the concerned faculty member must give a presentation highlighting achievements (such as materialization of MOU/ collaborative research proposal submission/ collaborative paper work, etc.). Others, especially the younger ones, will be benefitted from the experience.		Registrar/ Director to formulate the policy.	

	(v) Similar strategy may be developed for the doctoral students.		
Action No. 12	**Gap identified:** The reviewers recommend that the role of PhD students in undergraduate and MSc teaching laboratories be examined. Training should be provided to enable PhD students to carry out responsibilities within a laboratory e.g. correcting laboratory reports etc. These duties could be carried out under the supervision of academic staff and would enable a considerable reduction in workload.		

Recommended Action(s)	**Responsibility**	**Target Date**
The PhD students taking laboratory classes are adequately trained by the concerned subject teachers in the beginning of each semester. They perform duties under the consistent supervision of the academic staff.	Concerned subject teacher(s)	

Action No. 13	**Gap identified:** The School to identify **three PhD students** to be trained on major items of research equipment e.g. XRD, SEM etc. and progressively train three other PhD students every year on these major items of equipment so that there is a qualified pool of trained operators.		

Recommended Action(s)	**Responsibility**	**Target Date**
This is already in practice. The students are provided training regularly on major research equipment available at SPMS.	In-charge sophisticated lab/research lab	

Action No. 14	**Gap identified:** Re-evaluate the contact hours required of academic staff at all grades. This is currently 16/14/12 hours per week for different academic grades. It should be substantially reduced to approach norms in international research led universities. For example, TCD academic staff in Physics have six-seven contact hours per week.		

Recommended Action(s)	**Responsibility**	**Target Date**
The university authorities are looking into the workload model.	DoAA/DOCA	

Action No. 15	**Gap identified:** Changes to how teaching is delivered and increasing self-directed learning should reduce contact hours from academic staff and free up time for research as well as allowing more time for reflection by students. The delivery of teaching should be reviewed and aimed towards a learning outcome approach with adequate time and opportunity for self-directed learning through more reflective exercises, student projects, etc. without increasing the administrative workload or contact hours required of academic staff. A learning outcome based approach should be transparent to students with learning outcomes clearly articulated to students.		

Recommended Action(s)	**Responsibility**	**Target Date**
1. Training faculty members to effectively implement outcome based self-directing learning activities by conducting frequent workshops like CAPSL. 2. Engaging more technical staff and teaching assistants to assist faculties in laboratories. This will improves the skill delivery and reduce the laboratory / evaluation loads on teachers. 3. Improvement in laboratory infrastructure/experimental setups, besides introducing E-learning platforms. 4. Providing effective and smooth administrative support both at school and university level to free-up some time for research and development. 5. Syllabus can be bifurcated into two parts. Primary and Secondary. Primary part can be covered via class room teaching while the secondary part of the syllabus may be taken up through self-directed learning via assignments, group discussions, micro / macro projects, presentations, etc.	1. DOCA, DOAA 2. Registrar	

Action No. 16	**Gap identified:** Updated information technology solutions in lectures and a comprehensive student information system – capable of automatically reformatting student data – and the availability of science-discipline specific administrative support staff in SPMS to be associated with a new Science		

	Faculty Office, which would have a senior administrator who would handle reporting requirements on behalf of the Science Schools to the Deans, and interface on student administrative matters with the Department of Engineering.		
Recommended Action(s)		**Responsibility**	**Target Date**
A science-discipline specific administrative support staff may be appointed to report on behalf of the School(s) to the Deans, and interface on student administrative matters with the Departments of Engineering. TCD review recommends development/installation of Software within the School which will streamline the student/department information. This system should be capable of automatically reformatting the data as per the requirement.		Registrar and Head, CITM Dr. S. Jana to process the case from SPMS	May 2016
Action No. 17	**Gap identified:** Academic staff time currently used in purchasing, e.g. consumables and equipment, involves a bureaucratic ordering process, (with many steps of quotations, authorization, and negotiation before placing the order), which could be reduced by additional administrative support.		
Recommended Action(s)		**Responsibility**	**Target Date**
As per the TCD recommendations, an administrative support should be provided for handling school-specific purchases. TCD review recommends that the purchase process needs to be streamlined – this includes the reduction in multiple steps of purchase process. The same may be looked into and implemented.		Registrar	
Action No. 18	**Gap identified:** Review syllabi for bachelor's and master's degrees with a view to reducing staff-student contact time and increasing self-directed learning. The current teaching approach is driven by content rather than a learning outcomes approach. The amount of time devoted by academic staff to class contact time could be reduced by deciding which outcomes are most important and prioritizing these and allocating less important outcomes to self-directed learning by students.		
Recommended Action(s)		**Responsibility**	**Target Date**
University level policy may be devised for implementation of self-directed learning.		DoAA	
Action No. 19	**Gap identified:** There is very little use of IT in teaching and there is no compute server serving SPMS for teaching and research purposes. There are many additional software tools available for theoretical and experimental physics which should be available to students. For example, packages such as Mathematical, density functional theory programmes, Python, Origin, etc. are essential to the student learning process. Students mainly have their own laptops, but need access to a computer server with this software installed and maintained. They also need a dedicated space in which to work with desktop computers networked to a SPMS server or a wired local area network which students could connect their laptops to.		
Recommended Action(s)		**Responsibility**	**Target Date**
Present status of the IT infrastructure of SPMS: At present following IT infrastructure available at the school: • Each faculty member of the department is provided with a high-end laptop by the university. • As an integral part of campus wide Wi-Fi network, every part of the school is also covered by high-speed Wi-Fi connection. Each and every member of the school has direct access to the internet through an individual WiFi account. • The school has a dedicated seminar room equipped with laptop and LED-projector, where regular seminar (inhouse/invited) and lecture are held.		DoAA, Head, CITM (Dr. D. Deb - faculty-in charge from SPMS to coordinate)	**Dec. 2016**

Analysis of present IT facilities and practices at SPMS:

- As each faculty member has been provided with a personal laptop by the university, there is a great potential for the use of IT in delivering the professional duties may it be in teaching or contributing to academic research.
- The availability of a robust WiFi network has the potential to be used extensively for IT enabled delivery and sharing of academic resources among each member of the school.
- As part of university wide practice, some faculty members are already using the IT infrastructure of the university to maintain a online repository (Google drive/Google pages) of course materials related to the lectures that they are delivering.
- Each academic and research lab is equipped with many high-end desktops to maintain the research data and also has some propriety licensed software packages installed in them. However because none of those computers are interconnected with each other by a dedicated server-client system, the data transfer, mutual sharing of computation capacity, sharing of propriety scientific packages through network licenses are either not possible at all or not efficient.

Suggestions:

- The school need to have infrastructure/devices to record lectures/lab demonstration of various lab experiments and maintain a online repository of them so that students may use them in their own time for reference purposes.
- School should build and maintain a client-server system to integrate the computing facilities and also use the server as the main repository of latest software packages. Some of the packages could be Intel C/C++/Fortran/MPI Compiler, Python, AWK, Gnuplot, Origin, R, Mapple, Matlab, Mathematica, VASP, Gamess, LAMMPS, ESPResSo, LaTex, ANSYS, COMSOL Multiphysics, Gromacs, VMD etc.
- Maintain a dedicated open physical space equipped with available wired LAN ports, through which students can also get connected to the school's server and access the available software using their individual laptops.

To better teacher-student interaction, student-student interaction, student engagement we my implement the *Clicker* system in our lectures.

Action No. 20	**Gap identified:** Equipment in teaching laboratories is outdated. If resources are to be made available for renewing teaching laboratory equipment, academic staff responsible for teaching laboratories should review teaching laboratory practice in the Departmental Strategic Plan.		
Recommended Action(s)		**Responsibility**	**Target Date**
A comprehensive plan to revamp the academic labs of SPMS is in progress. Sufficient funds may be approved.		Respective lab-in-charges	July 2017
Action No. 21	**Gap identified:** Ask academic staff for proposals for innovations in teaching which would expand student learning experience beyond conventional lectures, tutorials and laboratory classes (e.g. poster presentations).		
Recommended Action(s)		**Responsibility**	**Target Date**
The faculty members are attending the CAPSL training workshops for innovation in teaching and the same will be implemented. Also see action point-15.			
Action	**Gap identified:** Some methods of assessment are unnecessarily cumbersome. For example, students		

No. 22	are required to give oral presentations of their MSc projects to staff over several days. This is very time consuming for staff. An alternative approach would be to ask students to prepare a poster and present them in an afternoon-long poster session in a similar style to a research workshop. This would give students training in an important presentation skill and free up staff and student time.		
Recommended Action(s)		**Responsibility**	**Target Date**
M.Sc. students will be advised to present their seminar in the form of poster. It will reduce the time of assessment. A core team will evaluate the presented work. However, thesis work has to be presented as PPT.

The other tests such as quizzes may be conducted in online mode. | | Respective teachers,

Head CITM (for online quizzes) | July 2016 |

Action No. 23	**Gap identified:** Complete an evaluation of online tutorial assignment systems as to whether any of these are currently pedagogically or economically viable for application to the physics or materials science and metallurgy components of the engineering degrees.		
Recommended Action(s)		**Responsibility**	**Target Date**
In this regard there are now two ways to approach the situation, one is through the interacting tools that can be deployed during the lectures and also in some ways off the lectures and other is using a online database of lecture materials and question banks that can be used for off lecture interaction between the teacher and the students. Following two methodologies may be adopted:

1. **Clicker System**: A *clicker* is a wireless (radio frequency) enabled device that is mainly used during a live lecture to interact with student. To use this device effectively each student is provided/registered with a unique clicker that he/she would be using through out the semester. Usability of the clicker system can realized mainly in the following two ways:
    ◦ During a live lecture, the teacher may organize his/her presentation in such a way that after each topic/idea is being introduced/taught, there would be simple multiple choice question asked to the live students, each students would right away answer the question by pushing the button (A, B, C, D or E) on their clicker and thus effectiveness of the lecture could be known immediately by the presenter, and hence appropriate approach/measure can be taken during the lecture itself or immediate afterwards. However it should be noted that the live clicker question has to be carefully designed and the success/failure here is crucially related to the correlation between the range of topic covered and properly justified level of expectation of the response from the live student, because not all ideas are equally and comprehensively absorbable.
    ◦ Secondly, clicker system can be deployed to take the sessional quiz tests. This way the total effort can be minimized, specially for a large class. The offline nature of our present quiz system can completely avoided and thus most important of all lot of precious time can be saved. Such a system can effectively also reduce the unintentional humanly errors and marking becomes more transparent.

2. **Moodle**: For an all round online system for learning management *Moodle* is one of the best software packages available in the marketplace. Moodle is freely available because it is a open-source software distributed under the GNU General Public License (GPLv3+) system. Just like many world class universities abroad, many of the IITs in India | | Head, CITM

Dr.Debabrata Deb to assist from SPMS | **Dec 2016** |

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	already use this system heavily for the learning management in their campuses. This software package is used to maintain an online system for each courses where teacher, student, parents can participate in a holistic manner. The package provides the means by which teacher can upload lecture materials such as presentation, text document, audio, video, questionnaires, tutorials etc. for the students to get access. There also can be discussion forum attached with the materials provided where all registered students and the teacher can participate in discussion and followups. Though the package comes at no cost, however maintaining and putting this at a proper use would certainly take lot of effort. The implementation such system would require a dedicated server system which would be connected to the intranet just like our present web-kiosk system. It would require extra manpower to deploy and maintain the system from the back end having the knowledge of computer hardware and networking. Each and every teacher would be needed to get training so that they may put the system in proper use.		
Action No. 24	**Gap identified:** Creating a centre of excellence with a critical mass and state-of-the art facilities will deliver research with higher impact. This will lead to greater opportunities for working with industry, international collaborations and centres in other institutes, in India and abroad. The immediate possibility would be working with centres in Trinity such as AMBER and TBSI. These centres are well established and recognised internationally.		

Recommended Action(s)	**Responsibility**	**Target Date**
SPMS proposes to establish a center of excellence (COE) in energy and allied fields. A committee under the chairmanship of Prof. Kulvir Singh has been constituted for the same. After comprehensive deliberations, the committee will submit a proposal for financial support.	COE committee	July 2016

Action No. 25	**Gap identified:** Most current research in SPMS is not commercially focused and is mostly driven by the interests of the staff. Orient some of the research themes to deliver the needs of the industry partners.		

Recommended Action(s)	**Responsibility**	**Target Date**
Faculty members are advised to look into the commercial viability in collaboration with the industry. Also see Action point-10.	HSPMS&DRSP	July 2017

Action No. 26	**Gap identified:** Computing facilities currently available to SPMS researchers, especially in theoretical physics, are totally inadequate for modern research in physics using numerical approaches.		

Recommended Action(s)	**Responsibility**	**Target Date**
Present Status of the Computing Facilities at SPMS: The following table contains the details of the computing facilities available at the different academic and research labs:	Dr.Debabrata Deb and Dr. S. Jana to process the case	Dec 2016

Lab Name (Academic /Research)	Hardware details	Software details (Operating System/ Plotting	PhD/Post Doc/ Master Thesis Students	

		Software/ Computing Packages /Compiler etc.)	**Working**			
Computatio nal Physics (*Academic*)	10 Dell Optiplex PC, 2.4 GHz Quad Core CPU, 750Gb Hard Disc, 8Gb RAM, 1G LAN Card, CD-DVD R/W Drive, 10 LCD Display, HP Laser Jet Printer	Ubuntu 12.04 LTS Linux, GNU C/C++/G90 Compiler, LAMMPS, Gnuplot, AWK, LibreOffice, VMD	38 MSc I, 23 MSc II, 05 Mtech I			
Nonlinear Dynamics (*Research*)	01 Dell Precision T5600 Workstation (Intel(R) XEON(R) CPU E5-2603, 4GB RAM, 500GB HDD, DVD R/W Drive), 01 Desktop (Intel i5 processor, 8GB RAM, 500GB HDD, 2GB NVIDIA graphic card, DVD R/W Drive), 01 HP Pavillion 23fi monitor, 01 DELL CRT monitor, 01 HP scanner, 01 Canon LBP6200d LaserJet printer.	02 Windows 7 OS, 02 Microsoft Office 2013, 01 Intel FORTRAN composer XE 2013 (for windows with IMSL) VISUAL FORTRAN, 01 OpTaliX-Edu (Optalix-Optical Engineering software)	02 – Master 02 – PhD			
Intermediat e Energy Physics (*Research*)	6 Dell Optiplex PC, 3 Lenovo PC, 1 Samsung PC, 1 Dell Server, 4 IBM x3650 Servers, 4 Dell Optiplex CPU, 1 Intex CPU, 1 HP Laserjet printer, 1 Canon LBP printer, 1 PS/2-USB KVMP Switch	Scientific Linux 6.2, Red Hat Linux , Windows Operating System	06 – PhD			
Theoretical Nuclear Physics (*Research)*	**Desktop:6, Server:1, Printer:4** 2 Dell PC,8GB RAM,CD-DVD R/W Drive; 2 Dell Optiplex 990 PC,1TB Hard Disk, 4GB RAM, CD-DVD R/W Drive; 2 Samsung PC,2GB RAM,5GB HDD,CD-DVD R/W Drive; 1Server(IBM)x3650 M4,Processor intel Xeon E2620(6 core),1333 MHz	FORTRAN 90 WITH COMPILER -77, Origin Pro 8.1, Latex(Mikte x-2.0, winedt 5.3), Linux6,6.2	02- Master 08- PhD 01-PostDoc			

	storage, 2x8 GB RAM, 300 GB Hard disk drive; 1 Printer HP officejet Pro 8600 (Colored); 1 Printer LBP2900 canon; 1 canon MF4500 series; 1 printer HP laserjet M272nf MFP.					
Particle Physics (*Research*)	**Desktop- 02**: 1. Lenovo B 40-30 (FDAW002LIN) AIO Desktop (4th generation i5/4GB/ITB)/WIN 8.1 Intel core i5-4460T 1.9 Ghz/H81 chipset/ 4GB DDR3 RAM/1TB 7200rpm HDD/ Wireless Keyboard & mouse/720 Web Cam/WIFI/DVDRW/ Nvidi 2GB GFX/HDMI IN and Out /21.5" IPS LED Screen/ Win 8.1 SL 64 bit/ 3 yrs Onsite warranaty. 2. HP Touch Smart 23-h011 in AOIdesktop i5-4570T/4GB/ITB/23 4th generation core I5-6400T Quad Core(2.2GHz)/8Gb DDR3 RAM/1TB HDD/DVD Drive/AMD R7 2 GB GFX/HDMI OUT/Card Reader/Windows 10/23" LED Full HD Touch Screen/WLAN/Wireless Keyboard & Mouse/ 3yrs Onsite warranty **Server -02**: 1. IBM System (X3550 M4 79141JA) Two socket Rack (1U) Intel Xeon E5 2609v2(Quad Core) Ivy Bridge,2.50 GHZ,10 Mb, 1333 MHz, 16GB*1,Open Bay, 2.5", Hot Swap	Mathematica 7.0, Linux 5.0	02 – Master 02 – PhD			

		SAS/SATA, Multi Burner, Integrated RAID 01, (M5110) 3 years Onsite+24*7				
		2. IBM Server				
		Printer -02:				
		1. HP Laser Jet Pro MFP M128fw (cz186A)				
		2. Canon ix7000				

Analysis of present computing capability:

Based on the available computing resources and potential users of the respective resources it is observed that:

- The academic lab for computational physics/numerical analysis is not adequate to support the need of 60 plus masters (MSc and MTech) students.
- The computation hardware facilities already available are not placed in better use due to the lack of their integration in a networked setup.
- Each lab is lacking in availability of high end and cutting edge computation software tool and expertise in using them.
- Non-availability of a dedicated open space equipped with computation facility for students.

Suggestions:
To improve upon the computing capability following are our suggestion:

- Build an all integrated wired network of all the available computation facilities.
  - ◦ A server-client system, wherein each computer placed physically in different lab will be connected to a server. Such a wired network system would give much faster connectivity for data/resource access.
  - ◦ All the major propriety computation resources may be placed in one server machine and hence can be accessed from all the client machines using network-license system, which is comparatively lot less expensive than dedicated individual license system.
  - ◦ A server-client system is more economic and has better data protection potential compared to a distributed system.
- To build the capacity to perform high-end large scale computer simulations, school must have a dedicated High Performance Cluster (HPC) facility consisting of hundreds of cores. This HPC may also be maintained as a part (subnet) of the integrated departmental server-client system there by giving access to each member of the group to use it through their individual client PCs.
- Procure latest software packages related to the various domains of theory group's research interests and as an integral part of such procurement, maintain a comprehensive training program for the individuals of the group. To this end, group members may also be encouraged to attend workshops or training at other research facilities of national/international repute.
- Maintain a dedicated open physical space equipped with available wired LAN ports, through which students can also get connected to the groups server and access the available software using their individual laptops.

Manpower Needed:
For the proper installation and maintenance of the computing facilities, it would be highly mandatory to have dedicated manpower associated with the computing

	labs.		
Action No. 27	**Gap identified:** In order to raise the international profile of research, it is vital for staff to raise the visibility of Thapar by presenting at international conference**s**. A significant barrier to this is the lack of financial support across all academic grade levels to allow for annual attendance by research staff at international conferences. A flat level of travel support for all grades (at the current level of support available to Senior Professors) including Associate and Assistant Professors could be given.		

Recommended Action(s)	**Responsibility**	**Target Date**
This is a policy matter which may be deliberated at University level. Also, see action point -11.	Registrar/ Director	

SWOT Analysis

Strengths	Weaknesses	Opportunities	Threats
I – Faculty & staff			
• Excellent teaching skills • Team spirit-get along • Funded research projects • Commitment of staff to student education • Staff motivated and want international exposure • Conducive work environment • Financial support to attend conferences, workshops • Computer, internet facility at offices and residences • Awards of Excellence • Flexible cadre structure – growth opportunities • Establishing CAPSL (Centre for Academic Practice and Student Learning) to expose the 'entire faculty to in-house learning modules including e-learning	• Technical staff • Faculty strength at senior positions • Student/teacher ratio is high in some programs • Less that 70% faculty with PhD in engg	• Need a flexible workload model that recognises the strengths of faculty • Promotion criteria should have regard to the workload model • Align teaching duties with staff interests • Review the recruitment criteria to enable the recruitment of best qualified suitable candidates • seek to improve staff:student ratio • Collaboration with reputed research labs. • Inter-departmental research & knowledge sharing • Consultancy	• Competition • Academic Leadership should be encouraged, recognised and promoted at all levels across the faculty • More strategic staff development planning • Seniority should not be the only factor in decision making and leadership appointments
• II – Research and Development			
• Sponsored research projects • PhD students • ME dissertations gets some research funding • International and national print and online journals	• Publications in High Impact SCI journals • Number of full time research scholars • Number of patents • Dedicated area specific research labs/ group research • Computational facilities needs improvement	• Create the culture whereby research is recognised and rewarded in terms of promotion and recognised as a significant contributor to the academic workload • Need an integrated research plan for the	

• collaboration • Strong research areas and groups • Constituted the "Senate Research Committee" to discuss all the matters pertaining to policies of Ph.D. programmes and other research parameters like consultancy, testing and IPR cell.	(hardware and software)	university, and the plan should identify selected areas in which Thapar can excel with regards to potential sources of research funding • Need to find mechanisms to get more and well-motivated Phd students (e.g. funded scholarships) • Need to greatly increase collaboration within Thapar, across Indian and International universities, and with industry • Need to revisit their current industry – university relationship model • More staff should be encouraged and be enabled to seek out new funding sources and apply for research grants, particularly on a partnership basis • Funding earmarked to support staff publishing in high level international journals • Significant infrastructure investment, particularly in research laboratories • Research labs should also be used to support undergraduate curriculum • Research bulletin, book writing • Many funding sources in govt and private which can be tapped • Institute – industry collaborations • MoU's with institutions of repute • Establish centres of excellence in key areas • Tap talent from outside for knowledge up

		• gradation	
		• Encourage PhD/M.E. Dissertations on industry problems	
• III – Student Intake			
• Strong reputation • Calibre of undergraduate intake • Students want to get international exposure • Student satisfaction • Extra-curricular activities • Counseling cell • Overall personality growth through finishing school • Societies activities	• Intake quality of PG and PHD students' needs improvement	• Special coaching for weak students	
• IV – Teaching and Learning Process			
• Shift towards greater reliance on self - directed learning, mini-project within the modules, research-led teaching, use of project work and assignments • Monitoring of instruction delivery process • Periodic curriculum review • Variety of UG/PG programs • Project semester, students projects • Student feedback – SRS	• Lack of expertise in some areas • Number of free or professional electives	• Undergraduate programs in emerging disciplines • More industrial visits	
• V – Infrastructure			
• UG/PG Laboratories • Basic infrastructure • Multi-media facilities in classrooms • Enough campus space – infrastructure	• Phasing out of obsolete equipment and slow Laboratory upgradation • Maintenance of machines/infrastructure • Inadequate built-up space • Renovation of faculty	• Department Library • Action on Industry Feedback • Involvement of industry in curriculum design • Seminar Room	

development opportunities	• offices required & build a new seminar room • Number of class rooms • Power backup in some labs		
VI – Placement			
UG Student Placement is close to 100%	• PG students placement		
VII – General			
• Well established name of university brand name • Saleable & strong UG program • Accreditation NBA/NAAC • Received ABET accreditation for Mechanical Engineering program in Aug 2016, • ABET visit done in Civil and ECED	• Some existing processes hinder good practices – example, the process to revise/update a course appears to be cumbersome • No central approach to research - Need to set up a research office. • Inadequate admin and technical supports at department and central levels	• Need greater transparency and democracy and staff involvement in decision-making processes • Need a long term integrated strategic planning and include research, teaching and learning, staffing, infrastructure, funding	

ACADEMIC CALENDAR 2015-16

ACADEMIC CALENDAR 2015-2016	
FIRST SEMESTER	
- Registration* **(OTHER THAN FIRST YEAR STUDENTS)**	20.07.2015 – 24.07.2015
- Commencement of Classes	20.07.2015 at 13:00 Hours
- Late Registration (With late registration fee)	25.7.2015 to 10.08.2015(with late registration fee of Rs 1000/-)
- Teaching (45 days)	20.07.2015 to 18.09.2015
Reading Week (one) for first year students	14.9.2015 to 18.9.2015
- Mid-Semester Test	21.09.2015 to 28.09.2015
- Teaching (26 days)	29.09.2015 to 06.11.2015
- Mid Semester Vacations* (05 days)	09.11.2015 to 13.11.2015
- Teaching (13 days)	16.11.2015 to 04.12.2015
Reading Week (one) (for first year students only)	30.11.2015 to 04.12.2015
- End Semester Examination	07.12.2015 to 21.12.2015
- Winter Vacations (13 days)	22.12.2015 to 03.01.2016
SECOND SEMESTER	
- Registration*	04.01.2016 – 08.01.2016
- Commencement of Classes	04.01.2016 at 13:00 Hours
- Late Registration (with late registration fee)	09.01.2016 to 22.01.2016 (with late registration fee of Rs1000/-)
- Teaching (50 days)	04.01.2016 to 11.03.2016
Reading Week (one) (for first year students only)	07.03.2016 to 11.03.2016
- Mid-Semester Test	14.03.2016 to 21.03.2016
- Teaching (34 days)	22.03.2016 to 06.05.2016
Reading Week (one) (for first year students only)	02.05.2016 to 06.05.2016
- End Semester Examination	09.05.2016 to 23.05.2016
- Summer Vacations (55 days)	24.05.2016 to 17.07.2016

Abbreviations:

CAS	-	Career Advanced Scheme
CAT	-	Common Admission Test
CBCS	-	Choice Based Credit System
CE	-	Centre for Excellence
COP	-	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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