



**SELF STUDY REPORT  
FOR RE-ASSESSMENT (Cycle-II)  
FOR  
AFFILIATED/CONSTITUENT COLLEGES**

Submitted to  
NATIONAL ASSESSMENT AND  
ACCREDITATION COUNCIL  
BANGALORE, INDIA



Submitted by  
RAJALAKSHMI ENGINEERING COLLEGE  
(Affiliated to Anna University, Chennai)  
THANDALAM, CHENNAI -602 105



**January 2016**



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**LIST OF ABBREVIATIONS**

ACM	-	Association for Computing Machinery
AICTE	-	All India Council for Technical Education
ASME	-	American Society of Mechanical Engineers
AUTO	-	Automobile Engineering
BEC	-	Business English Certificate
BME	-	Biomedical Engineering
BRSI	-	Biotechnology Research Society of India
BT Society	-	Biotechnology Society
CAMS	-	Campus Attendance Monitoring System
CAT	-	Common Admission Test
CCTV	-	Closed circuit TV
CFTRI	-	Central Food Technological Research Institute
CGPA	-	Cumulative Grade Point Average
CII	-	Confederation of Indian Industry
CSE	-	Computer Science and Engineering
CSI	-	Computer Society of India
CTS	-	Cognizant Technology Solutions
DIT	-	Department of Information Technology
DOS	-	Department of Space
DOTe	-	Directorate of Technical Education
DRDO	-	Defence Research and Development Organization
DSIR	-	Department of Scientific Industrial Research
DST	-	Department of Science and Technology
ECE	-	Electronics and Communication Engineering
EDC	-	Entrepreneurship Development Cell
EEE	-	Electrical and Electronics Engineering
ETC	-	Employability Training Camp
FDP	-	Faculty Development Programme
FICCI	-	Federation of Indian Chambers of Commerce and Industry
GATE	-	Graduate Aptitude Test in Engineering
GMAT	-	Graduate Management Admission Test
GRE	-	Graduate Record Examination
H&S	-	Humanities and Sciences
HOD	-	Head of the Department
HR	-	Human Resources
HVAC	-	Heating Ventilation and Air Conditioning
IBM	-	International Business Machines
ICMR	-	Indian Council of Medical Research
ICT	-	Information Communication Technology
IEEE	-	Institute of Electrical and Electronics Engineers
IGCAR	-	Indira Gandhi Centre for Atomic Research
IES	-	Indian Engineering Services
IET	-	Institute of Engineering and Technology
IIIE	-	Indian Institution of Industrial Engineering
IIM	-	Indian Institute of Management
IPC	-	Innovative Project Cell
IQAC	-	Internal Quality Assurance Cell
ISO	-	International Organization for Standardization,
ISRO	-	Indian Space Research Organization

ISTD	-	Indian Society for Training & Development
ISTE	-	Indian Society of Technical Education
IT	-	Information Technology
KMC	-	Knowledge Management Cell
LCD	-	Liquid Crystal Display
MEMS	-	Micro Electro Mechanical Systems
M.E.PED	-	M.E in Power Electronics and Drives
MMA	-	Madras Management Association
MSSRF	-	M.S Swaminathan Science Research Foundation
M.Tech. BT	-	M.Tech in Biotechnology
NASSCOM	-	National Association of Software and Services Companies
NEN	-	National Entrepreneurship Network
NME-ICT	-	National Mission on Education through Information and Communication Technology
NPTEL	-	National Programme on Technology Enhanced Learning
NSS	-	National Service Scheme
OHP	-	Over Head Projector
PDF	-	Post Doctoral Fellowship
PG	-	Post Graduate
Ph.D.	-	Doctor of Philosophy
PI	-	Principal Investigator
PLC	-	Programmable Logic Controller
RCAB	-	Research and Consultancy Advisory Board
RCC	-	Reinforced Cement Concrete
R&D	-	Research and Development
REC	-	Rajalakshmi Engineering College
RO	-	Reverse Osmosis
RPS	-	Research Promotion Scheme
SAE	-	Society of Automobile Engineers
SBC	-	Society of Biological Chemists
SBT	-	Social Business Trust
SIFE	-	Students in Free Enterprise
SIRO	-	Scientific Industrial Research Organization
SIPCOT	-	State Industries Promotion Corporation of Tamilnadu
STEM	-	Science, Technology, Engineering and Mathematics
TANCET	-	TamilNadu Common Entrance Test
TCS	-	Tata Consultancy Services
TCMPF	-	TamilNadu Cooperative Milk Producers Federation
TIFAC	-	Technology Information, Forecasting and Assessment Council
TIFAC-CORE	-	Centre of Relevance and Excellence
TSDP	-	Technology Systems Development Programme
UC	-	Utilization Certificate
UG	-	Undergraduate
UTLP	-	Unified Technology Learning Platform
VAP	-	Value Added Programme
YRC	-	Youth Red Cross

**VISION:**

To be an institution of excellence in Engineering, Technology and Management Education and Research. To provide competent and ethical professionals with a concern for the society.

**MISSION:**

To impart quality technical education imbued with proficiency and humane values. To provide right ambience and opportunities for the students to develop into creative, talented and globally competent professionals. To promote research and development in Technology and Management for the benefit of the society.

## EXECUTIVE SUMMARY

“A Nations’ treasure is in its scholars”

### History and Growth of the College

With a commitment to offer quality education and with Hard Work and Discipline as the motto, REC was established in the year 1997 under the aegis of Rajalakshmi Educational Trust with 3 UG programmes with a total intake of 180 students. Growing from strength to strength, the institution has progressed and is now offering 11 UG and 10 PG programs with an annual intake of 1759 students in the year 2015, and stands in the Top 5 % among the 571 self financing colleges, affiliated to Anna University, India’s largest technical university.

The college is located in Thandalam, about 35 kms from Chennai, on the Chennai-Bangalore National Highway in a serene atmosphere spread over a sprawling area of 27.17 acres. It is closer to SIPCOT, an industrial estate, that houses many leading industries, including some of the MNCs such as Hyundai Motors, Saint Gobain, Flextronics, Reynolds etc., Thus its location is ideal and appropriate for peaceful and active learning, leading towards a promising future of the students.

REC, which stands for the mark of quality, has continued to make several strides towards excellence in the last 8 years after NAAC peer team visited the campus in March 2007 for the first accreditation and subsequently in 2013 for reaccreditation. The college has been certified for the ISO 9001: 2008 certification by the internationally acclaimed TUV NORD, Germany for its high academic standards in March 2013 and subsequently surveillance audit is conducted annually. The college has been awarded 2 (f) and 12(B) status by the UGC.

All the eligible under graduate programmes have been accredited/reaccredited by the National Board of Accreditation (NBA), New Delhi. Six programmes, viz., B.E. Mechanical Engineering, B.E. Electronics and Communication Engineering, B.E. Electrical and Electronics Engineering, B.E. and M.E. Computer Science & Engineering and Master of Business Administration (MBA) have been granted Permanent Affiliation by Anna University, Chennai.

Fruitful partnerships with industries have resulted in accreditation of the college by TCS, CTS and Wipro Technologies. College has been recognized as “Centre of Excellence in Automotives” by Ashok Leyland. IBM centre of Excellence, BOSCH Automobile Training Centre, WIPRO UTLP Centre for Embedded System Design, L&T Infotech’s Pravesh, NASSCOM’s programmes, CII’s College Excellence Clusters and Wipro Mission 10X etc., are some of the other hallmarks of interaction with industries.

Rajalakshmi Engineering College is ranked in the top ten colleges among the 552 colleges affiliated to Anna University, and 9<sup>th</sup> among all the engineering institutions in tamilnadu by a recent survey conducted by OUTLOOK based on placement, infrastructure, academic ambiance etc., According to a survey conducted by AICTE and CII for the year 2012, REC has been rated as one of the top Colleges in India having the best industry institute interaction. DATAQUEST, a technical magazine, ranked 100 technical institutions based on a survey of colleges, employers and alumni in 2015 and REC has come in the 22<sup>nd</sup> place. Similarly another

magazine, 'Higher Education Review' has recognized REC as "Engineering College of the year 2014" in acknowledgement of the Industry Alignment impacting the Society and the Education Fraternity. The Microsoft Corporation India Private Ltd. has awarded a 'Certificate of Achievement' to REC for having qualified for Platinum level recognition under the Microsoft 'ED-Vantage' program for the period 10-10-2013 to 09-10-2014.

The Industry-Institute interaction is further strengthened time to time by initiating MoUs for a specified period with reputed organizations such as IBM Global Services; Chennai based Super Auto Forge, Valeo India Private Ltd., ABAN infrastructure Private Ltd. (Biotechnology division), Bosch Ltd., Bengaluru; Faber Sindoori Management services (a company aligned with Apollo hospitals) and Aries Biomed Tech private Ltd.; TCS Ltd., Infosys; US technologies; Sutherland global services; Regional Telecom Training Centre, Chennai and Hitachi solutions India Private Ltd. Further, the institution maintains symbiotic relationship with multiple industries across diverse segments, which has improved the placement of students in software and core companies. TCS Best Student Award, TCS Best Student Project Award, Best CSI Student Award, Best International Student Event Host Award, Longest Continuous SBC Award etc., are some of the distinguished awards and recognition given by the industries.

The teachers of REC have a passion towards their profession. The subjects are assigned to the faculty members based on their competency matrix, specialization and experience. Well ahead of the start of the semester, teachers prepare an elaborate lesson plan, notes on lesson, question bank for every theory subject and a lab manual for every practical course. A mentor who has a long standing experience in the subject guides the faculty members handling the particular subjects. The lesson plan, notes of lesson, question bank etc., are posted in the Moodle server which enable the students to refer and prepare in their own pace and time. To bridge the gap between the university prescribed curriculum and requirements of the industries, suitable additional topics are covered in every theory and laboratory course. Students' subject knowledge is further strengthened by relevant guest lectures, workshops, conferences etc. Bridge courses are organized for the freshers, slow learners and lateral entry students.

In moving towards the 'outcome based approach' in the teaching-learning-evaluation process, every programme in the institution has formulated a set Programme Educational Objectives (PEOs) and Programme Outcomes (POs). Apart from this, a set of Five Course Outcomes (COs) have been framed for each course, corresponding to each of the five units in the syllabi for that course. Systematic procedures have also been devised for assessing the attainment of these Outcomes.

The academic calendar is planned well in advance. The regular classes are complimented with tutorial classes, special classes for students with arrears, and repeat classes for slow learners. Indigenously developed software CAMS and SUPER are effectively employed in monitoring the attendance and performance of students, for timely intervention and effective counselling. Regular Unit Tests and model examinations are conducted centrally by the Examination Cell in a very organized manner. Prompt valuation of the answer scripts and entry of the marks in CAMS software help in monitoring the performance of the students and sending a report to the parents.

Class Committee meetings are conducted to get feedback from the students on syllabus completion, and difficulties faced in the learning process. Online feedback is also collected from

the students during the middle of the semester. Based on these feedback points, appropriate remedial steps are taken in time to enable the students to progress in their studies without any difficulty. Parents and industry personnel also give their feedback on the overall progress of the students. The performance in the competitive exams, placement in reputed companies, admission for higher studies in well known institutes in both India and abroad and the number of university ranks secured by the students both at UG and PG levels, are indicators of success achieved in the teaching learning process. It may be noted that the number of University ranks has increased from 7 in 2007 to 92 in 2015.

REC provides full time counselling for students, addressing relationship issues, depression, anxiety and personality problems by a full time professional counsellor. This is in addition to regular counselling by faculty counsellors and systematic general counselling organized once in every semester. All these efforts have made a great change in enhancing learning ambience of the students who are in real need of moral support and guidance.

Faculty Development Programs, Wipro's Training the Trainer Mission 10X, Transactional Analysis, English Language proficiency programs, Webinar series of lectures by eminent professors with long years of experience, NPTEL, NME-ICT, Classle.net are introduced for the benefit of teachers and students. It has been our endeavor to identify time to time, the weaknesses in any of our systems and take appropriate steps to strengthen those areas.

Modern ICT enabled teaching aids, audio-visual screening, role plays, simulations, field visits, surveys and presentations are also effectively used. The campus is Wi – Fi enabled and the internet bandwidth of 116 MBPS is provided.

Eminent industrialists, researchers, and scientists visit the REC campus to share their knowledge and inspire the staff and students. Dr. R. Chidambaram, Principal Scientific Advisor, Government of India, Dr. A. Sivathanu Pillai, distinguished Scientist, Chief Controller R&D, DRDO, Ministry of Defence, Government of India and Chief Operating Officer & Managing Director of Brahmos Aerospace, Dr. Yasuki Tabata, Professor, Kyoto University, Japan, Dr. R. Natarajan, former Chairman, AICTE, former Vice-Chancellors of various universities are some of the distinguished personalities who have visited the campus over a period of time and shared their experience and offered very valuable suggestions for further development of the institution in its service to the society and marching towards excellence.

From the academic year 2011-12, a clear procedure has been evolved to review annually, the overall performance of the departments. For this purpose, a specific format has been framed enlisting the various aspects covering the teaching learning process, university examination results, FDPs, guest lectures, industrial visits, students' and faculty achievements, R&D activities, projects carried out, consultancy work, paper publication etc. In a meeting addressed by the Chairperson, Advisor and Principal, the departments present their performance in these areas and also their plan of activities for the ensuing academic year. The committee holds an elaborate discussion on the presentation and suggests suitable ways for further improvement.

Due to the sustained efforts of the institution to improve quality, the maximum mark of the students at entry level has increased. This is an indicator of the reputation of the college among the general public, who believe in the commitment and progress of the institution.

DEPARTMENT	% of MAX. MARKS 2007	% of MAX. MARKS 2015
B.E. Mechanical Engineering	90.50	98.5
B.E. Aeronautical Engineering	96.50	96.0
B.E. Automobile Engineering	80.30	96.7
B.E. Biomedical Engineering	90.70	97.0
B. Tech. Biotechnology	91.30	97.8
B.E. Computer science and Engineering	92.00	97.8
B.E. Electronics and Communication Engineering	94.67	97.8
B.E. Electrical and Electronics Engineering	92.00	97.0
B.Tech. Information technology	92.50	96.3
B.E. Civil Engineering	---	95.7
B.E. Mechatronics Engineering	---	95.5

The college has all the necessary facilities with experienced and well qualified faculty members to develop the young minds in a learning environment of high academic ambience. In tune with the increasing enrolment, there has been marked improvement in infrastructure facilities. New academic blocks with state of the art labs, workshop, and standby generator, accommodation for the Civil Department, Electrical Maintenance, Transport and Estate Maintenance departments, new hostels, extra canteens, mess, dining halls and sewage treatment plant are some of the infrastructural developments in the last two years. The college also has adequate space and amenities to conduct competitive exams like GMAT, organize National level competitions and be the zonal centre for Anna University paper valuation. A Heritage Center named after Sir. C.V. Raman has also been established, housing a museum wherein models and posters depicting the course of development in various fields of engineering and technology and also a seminar hall to project videos of such innovations and advancements has been put in place.

The College is committed to promote sports activities towards the all-round growth of its students. The campus has 6000 sq.ft. in-door facilities for Chess, Caroms, Table Tennis, Ball Badminton and 30,000 sq.ft. out-door facilities for Volley Ball, Foot Ball, Tennis, Cricket etc. The College has two well qualified Physical Education staff and Department Sports Coordinators to train the students on the roll. The institution hosts Anna University zonal tournaments in the campus, wherein colleges from different parts of Chennai and Tamil Nadu participate.

A serene green campus sets an ambience for peaceful learning. Such is the college campus which is well maintained by a team of committed gardeners and the buildings are kept clean by housekeeping staff members, supervised by the administrative department.

Being a distinguished centre for higher learning, the college promotes research in all areas of science, engineering and technology. Nine departments of REC have been recognized as research centers by the affiliating Anna University. 10 scholars have obtained Ph.D. through these centres so far and presently 60 are doing Ph.D. Programme in these centres. There is a Research and Consultancy Advisory Board in the institution with eminent academicians as its members, motivating and assisting a number of sponsored projects being carried out by faculty members of various departments and enabling new knowledge creation in the institution. In the last academic year alone, REC has received 24 sponsored projects with a total funding of 269 lakhs from AICTE(RPS), ICMR, TSD-DST and UGC, which includes very socially relevant

projects such as ‘Developing teaching aids for autism and Detection of fetus abnormalities by thermal imaging techniques. So

Subscription to online e- journals, sabbatical leave for Ph.D. and post doctoral research scholars, funding of internal projects are some of the steps taken by the institution to further promote research activities.

TIFAC- CORE on Machine Vision, sponsored by Government of India, Ministry of Science and Technology is another feather in the cap for REC. Launched in 2009, with a project outlay of 5.15 crores and commencing its activities in an area of 6300 Sq.ft comprising laboratory with necessary equipment, conference room and lecture halls, it has been catering to the needs of industries providing expert consultancy, conducting research in the thrust areas of machine vision such as 3D object recognition, low cost MV solutions etc., and organizing short term and certificate programmes.

A national MEMS design centre (NMDC) was established in the College under the National Programme on Micro And Smart Systems (NPMASS) for the benefit of users in this region. The centre has MEMS CAD tools, Intellisuit 8.0, COSMOL 4.1, Tanner EDA tool and Coventor Ware 2010&MEMS+2.0. Fabrication facilities such as Wet lab, Porous Silicon formation set up, Semiconductor device analyzer (under AICTE funding) and Electromechanical work station. The focus of the centre is to train the faculty and students in REC and also others in this region to design MEMS gadgets with CAD tools and to design and fabricate MEMS devices for bio-chemical sensors and MEMS actuators using MEMS micro fabrication technology. A large number of consultancy and research projects are being carried out including the recent DST- TDS sponsored project for an outlay of 116 lakhs. A state of the art ‘clean rooms’ facility is also being created with Class 1000 and 10,000 specifications at a cost of 45 lakhs in the college, enhancing semi conductor fabrication and embossing techniques.

The following labs/centres also help to provide scientific temper and cultivate research aptitude in the faculty and students:

- Robotics lab (LEMA) established in 2010 to train students in robotics in collaboration with IIT madras.
- Think labs for embedded systems in collaboration with IIT B – Mumbai.
- IBM Center of Excellence.
- BOSCH Training lab for joint certification programmes.
- UTLP on embedded systems in collaboration with WIPRO Mission 10X
- Cisco Enabled Education Development Academy (CEED Academy)

From two Anna University research centers in 2007, seven more departments at REC have been recognized as research centers to conduct Ph.D. and M.S. programmes. This is in recognition of the fact that REC has the necessary infrastructure and researchers to engage themselves in quality research and developmental activities. Number of Ph.D. holders in 2007 was 17 (8%) and has now increased to 72 (18%) as on Jan 2016. 116 (28%) faculty members are presently pursuing research in various departments.

The college has an active Innovative Project Cell, IPC, recently christened as **A.P.J. Abdul Kalam Innovative Project Cell**, that organizes a competition every year, known as “i Quest”. The proposals submitted to i-Quest have won appreciation and laurels and some of these proposals have been filed and followed up for securing patents. To mention a few of such

achievements in earlier years, the team ISOTOPS of REC won the BAJA SAE, India award in the “All Terrain Car competition” held at the national automotive testing and R & D infrastructure project facility at Pithampur and the team also bagged the innovation award and cost award sponsored by TATA Motors. The expense for the project was initially sponsored by the management on recommendations of IPC. Parthiba Rajan of Biomedical Engineering won the National Innovation Foundation Award. He received the award from the former President of India Dr. APJ Abdul Kalam, in a function held at Ahmedabad. So far, 18 patents have been filed and ‘innovation at REC’ a compendium of inventions has been published.

The dedicated **Training and Placement Cell** at REC has taken a paradigm shift in training the engineering and management students to cater to the blue chip companies visiting the campus for campus selection. The training programs, workshops, education fairs and value addition programs are all scientifically planned and organized to ensure that the students derive maximum benefits. The flagship training program offered to students during the 5th and 6th semester is the “Residential Employability Training Camp”. There are spacious air conditioned halls to conduct pre-placement talks and other programmes, computer labs to conduct online tests, class rooms for other tests, halls to conduct group discussions and interview cabins. Accenture has conducted a common campus drive for 2500 candidates from all over India. The placement cell has the capacity to host campus recruitment for 3500 candidates.

REC Alumni are also doing very well, occupying distinguished positions in industries both in India and Abroad. REC Alumni Association “RECAL”, registered with the Registrar of Societies, is also very active in interacting with the institution. International Alumni Chapters such as RECAL-UK & RECAL-Dubai also exist and periodical alumni meet are held.

Interactive instructional techniques are practiced to develop competency in students to face the global demands. The virtues of hard work, discipline and ethical practices in the profession are imbibed in them constantly during their campus life. An Ethics club is functioning in the college which arranges weekly lectures in the evening on such themes and also on topics describing life sketches and teachings of great achievers.

Students are also motivated to participate, under the guidance of faculty members in a number of cocurricular activities such as design contests, technical paper and poster presentation and National and International Conferences and quiz competitions. Proportionate prize money is also sanctioned to winners of these competitions.

In tune with the vision of the college to bring out globally competent professionals with a commitment to serve the society, the budding engineers of REC are faithfully involved in community services through SIFE/ENACTUS, NSS, YRC, ROTRACT etc. Their contributions are appreciated by the voluntary organizations.

Students’ entrepreneurial skills are honed through Entrepreneurship Development Cell (Kriya), which also helps the economically weaker students to ‘earn while they learn’. The EDC has brought in various innovations and the students work for it with commitment and dedication. The EDC guides them to apply for external funds and patents. EDC of the college functions in collaboration with National Entrepreneurship Network and CII. With the support of the management, an Aavin parlour namely *Melting Point* which is a registered refreshment outlet of the TCMPF (Tamil Nadu Cooperative Milk Producers' Federation) and also a Bookstore named

‘**REC RECEPTACLE**’ are businesses managed and run by students completely. The Melting point has been the winners of NEN – TATA FIRST DOT judge’s choice of TOP 5 STUDENTS START UPS in India. EDC has recently received a grant of Rs. 7 lakhs from AICTE to promote entrepreneurial activities in the campus.

Campus life here stresses the importance of extra-curricular activities apart from academic learning, leading them to many new avenues. Students sent for participating in the Inter Collegiate sports and games have won many trophies in various events. The college volleyball teams are unbeaten State champions and won many tournaments in intercollegiate and National level matches.

Music, dance and drama are forms of art that provide relaxation from the work stress and exemplifies team spirit. The college realizes this need and provides the required platform to showcase the very rich talent pool. The college light music band called *Unison* has won several laurels. The college also supports a dance and theatrical team. A two day intercollegiate cultural extravaganza *Prasidhi* and one day college cultural programmes are organized by the students. *ATRIUM*, the literary club of the college encourages students interested in literary activities. The **Cultural Club** of Rajalakshmi educational trust organizes music programs and discourses for the benefit of one and all.

The prestigious 34<sup>th</sup> World University Debating Championship was organized for the first time in India at Rajalakshmi Engineering College from 28<sup>th</sup> Dec. 2013 to 3<sup>rd</sup> January 2014, with a participation of 800 teams from 98 countries. This mega event was possible due to the active involvement of REC students at earlier WUDCs held at Manila in 2011 and at Berlin in 2012.



### World Universities Debating Championship 2014 at REC

These go a long way in making the students eminently suited to contribute in their career with an ever open mind for new thoughts and ideas in industrial and technological advancements. The institution is confident that the students equipped with such capabilities will emerge ultimately as leaders in their chosen path and thereby help as agents in the growth of the nation.” – Correspondent.

The college has plans to establish centers of excellence in the fields of MEMS, renewable energy and bio product development and to be recognised by UGC as a “**Center with Potential for Excellence**”.

REC is marching towards excellence with Committed Management, Competent Faculty Members and Staff, and Enthusiastic Students with a positive attitude.

We at REC are poised to take a giant leap into another dimension of academic upswing in the years to come. We have miles to go before we look back and smile at our achievements. The inspiring quote of the institution exhorts the students that “The world needs you”.

### Introduction to “**The Management – The Guiding Spirit**”

Tremendous advancement is taking place in every field of engineering and technology and revolutionary progress in communication, transport and information technology has shrunk the world into a global village. Constant self assessment and continuous improvement have become very indispensable for higher educational institutions to produce highly motivated and knowledgeable engineers.

The Correspondent and Chairperson of Rajalakshmi Engineering College are scholars with great vision. “In a country where education is held in very high esteem and the teacher equated with god, we at Rajalakshmi Engineering College have dedicated ourselves to impart quality education and also develop the students to be responsible professionals and individuals”  
– Correspondent

Mr. S. Meganathan, Correspondent, a Mechanical Engineer, graduated from the Government College of Technology, Coimbatore in the early 1970’s is a Fellow of Institution of Engineers. Born in an agricultural family, he grew as an industrialist with interests in manufacturing, ITES and Power Sectors. His philanthropic approach and a deep desire to serve the society have led to the genesis of the Rajalakshmi Educational Trust.

Dr. (Mrs.) Thangam Meganathan, the Chairperson of Rajalakshmi Engineering College is an educationist and an accomplished researcher. With M.A. and M.Phil. in Public Administration, she pursued her interests in research that culminated into her thesis viz., “Technical Education in Tamil Nadu – A Study” for which she was awarded Ph.D. by the University of Madras. She visualizes that educational institutions should nurture and develop creative and competent minds and towards that, course delivery and value added programmes should be offered in a conducive learning atmosphere. She is an ardent votary for Students’ Counseling and Faculty Development Programmes with constant focus on quality in all aspects.

Dr. C.R. Muthukrishnan, Advisor, Rajalakshmi Group of Institutions is an eminent scholar from IIT-Madras, with an illustrious career spanning over 45 years. He has held visiting academic and research positions at Carnegie Mellon University and the University of California, San Diego, and he has also been a consultant for many industries in India and abroad, including Collabnet, Google and Essentia. He has been a mentor for the faculty members and students. His suggestions in the academic activities especially in teaching-learning and evaluation processes have been helping the institution to reach top positions amongst the reputed institutions under Anna University.

Mr. K. Jayaramakrishnan, Chief Executive Officer, REC was the Vice-President, Global Alliances and Strategic relationship at Tata Consultancy Services. He is a Post graduate in Management with specialization in Systems and Marketing from the Bajaj Institute of

Management, Mumbai. He has over 30 years of experience in IT related industries. The institution is fortunate to have a person of Mr. Jayaramakrishnan's stature to be the CEO to manage the activities of REC.

Dr.M.Subbiah, Professor of Electrical & Electronics Engineering of Rajalakshmi Engineering College has a long teaching and research experience spanning over 40 years. He was formerly Professor and Head of the Department of Electrical and Electronics Engineering and Dean (Administration) at National Institute of Technology, Trichirappalli. He has guided a number of Ph.D. scholars and published a number of research papers in National and International Journals and has 2 patents to his credit.

Mr. M Abhay Shankar graduated in Electronics and Communication Engineering from the College of Engineering, of the renowned Anna University, Chennai. He chose M.S. in Engineering Management for his masters in Syracuse University, USA. Endowed with an entrepreneurial spirit and focus, he is interested in Automotives and Manufacturing sectors. He has been involving himself in the Infrastructural Development and the Placement & Training activities of the College.

Mrs Tejshree Abhay is a Marketing Management graduate from Loyola Institute of Business Administration, Chennai. With a strong Marketing & Media background, Tejshree has been actively involved in the development of the institutions Administration and Marketing activities.

Dr. M. Haree Shankar is a service minded youth and a keen lover of Sports and has been instrumental in expanding the sports activities and sports facilities of the institution. In addition, the Governing Council and the College Development Council have eminent personalities from academia and industries to guide and direct the institutional activities.

**PROFILE OF THE AFFILIATED /CONSTITUENT COLLEGE**

## 1. Name and address of the college

Name	RAJALAKSHMI ENGINEERING COLLEGE
Address	RAJALAKSHMI NAGAR, THANDALAM
City	CHENNAI
Pin	602 105
State	TAMIL NADU
Website	www.rajalakshmi.org

## 2. For communication

Designation	Principal	Vice Principal	Steering Committee Coordinator
Name	Dr.G.Thanigaiyarasu	Dr.S.N. Murugesan	Dr.Johanna RajKumar
Telephone with STD code	O:04437181119	O:04437181070/ R:04423615380	O:04437181064/ R:04422398076
Mobile	9444383669	9791135753	9962580061
Fax	37181113	37181113	37181113
Email	principal@rajalakshmi.edu.in	viceprincipal@rajalakshmi.edu.in	johanna.rajkumar@rajalakshmi.edu.in

## 3. Status of the Institution

- a) Affiliated College
- b) Constituent College
- c) Any other (specify)

## 4. Type of Institution

- a) By Gender
- i. For Men
- ii. For Women
- iii. Coeducation

## b) By shift

- i. Regular
- ii. Day
- iii. Evening

## 5. Is it a recognized minority institution?

- a) Yes
- b) No

If yes specify the minority status (Religious/linguistic/ any other) and provide documentary evidence

### Linguistic

(Refer Annexure 1)

6. Source of funding
- |                   |   |
|-------------------|---|
| a) Government     |   |
| b) Grant-in aid   |   |
| c) Self-financing |   |
| d) Any other      | ✓ |
7. a) Date of establishment of the college  
30/10/1997

b) University to which the college is affiliated /or which governs the college (If it is a constituent college)

ANNA UNIVERSITY-CHENNAI

c) Details of UGC recognition

Under Section	Date, Month & Year (dd-mm-yyyy)	Remarks (If any)
i. 2 (f)	21-04-2008	Letter dated 10-4-2008 UGC
ii. 12 (B)	16-04-2014	Letter No F. NO. 8-42/2006 (CPP-I/C)

(Refer Annexure 2)

(Refer Annexure 3)

d) Details of recognition/approval by statutory/regulatory bodies other than UGC

(AICTE, NCTE, MCI, DCI, PCI, RCI etc.)

Under Section/clause	Recognition/Approval details Institution/Department/ Programme	Day, Month and Year (dd-mm-yyyy)	Validity
i	AICTE (Engineering and Technology Programmes)	F.No. Southern/1-2460015600/2015/EOA/Corrigendum-1 Date: 29-Apr-2015	2015 - 2016
ii	AICTE MBA	F.No.Southern /1- 2449947468/2015/EOA A Date: 07 Apr 2015	2015 - 2016
iii	AICTE MCA	F.No.Southern /1- 2449922662/2015/EOA A Date: 07 Apr 2015	2015 - 2016

(Refer Annexure 4)

**(Refer Annexure 5)**

8. Does the affiliating university Act provide for conferment of autonomy (as recognized by the UGC), on its affiliated colleges?

- a) Yes
- b) No

If yes, has the College applied for availing the autonomous status?

- a) Yes  \*
- b) No

\*Yet to avail autonomous status from Anna University.

9. Is the college recognized

a) By UGC as a College with Potential for Excellence (CPE)?

- a) Yes
- b) No

If yes, date of recognition: ..... (Dd/mm/yyyy) for its performance by any other governmental agency?

b) For its performance by any other governmental agency- Yes

If yes, Name of the agency –

- Department of Scientific and Industrial Research, National Board of Accreditation and Department of Science and Technology (TIFAC CORE)
- Date of recognition of SIRO by Department of Scientific and Industrial Research: **01.04.2012 (Refer Annexure 6)**
- Date of approval of TIFAC CORE by Department of Science and Technology : **22.09.2008 (Refer Annexure 7)**
- DST sanctioned NPMASS (National Program on Micro And Smart Systems) : **July 2009 (Refer Annexure 8)**

Date of Accreditation/Re-accreditation of programmes by National Board of Accreditation (AICTE):

Degree	Programme	Date
<b>B.E.</b>	Computer Science and Engineering	01-07-2014
<b>B.E.</b>	Mechanical Engineering	01-07-2014
<b>B.E.</b>	Electronics and Communication Engineering	01-07-2014
<b>B.Tech.</b>	Biotechnology	01-07-2014
<b>B.E.</b>	Automobile Engineering	01-07-2014
<b>B.E.</b>	Aeronautical Engineering	01-07-2014

<b>B.E.</b>	Biomedical Engineering	01-07-2014
<b>B.E.</b>	Electrical and Electronics Engineering	16-09-2011*
<b>B.Tech.</b>	Information Technology	27-07-2006*

\*Applied for re-accreditation

10. Location of the campus and area in sq.mts:

Location *	Semi Urban
Campus area in sq. mts.	1, 09,588 sq mts.
Built up area in sq. mts.	<b>74760.37</b> sq mts. (RCC) <b>5735.00</b> sq mts. (Shed)

(\* Urban, Semi-urban, Rural, Tribal, Hilly Area, Any others specify)

11. Facilities available on the campus (Tick the available facility and provide numbers or other details at appropriate places) or in case the institute has an agreement with other agencies in using any of the listed facilities provide information on the facilities covered under the agreement.

- Auditorium/seminar complex with infrastructural facilities :
- Sports facilities
  - \* Playground:
  - \* Swimming pool
  - \*Gymnasium
- Hostel
  - \* Boys' hostel
    - i. Number of hostels : 2
    - ii. Number of inmates : 705
    - iii. Facilities (mention available facilities) : Internet Room, Indoor Games, ATM, Gym, Post Box, Stationery Store, Mess, telephone
  - \* Girls' hostel
    - i. Number of hostels : 2
    - ii. Number of inmates : 498
    - iii. Facilities (mention available facilities) : Internet Room, Library, Indoor Games, ATM, Post Box, Stationery Store, Mess, telephone
  - \* Working women's hostel
    - i. Number of inmates -Nil
    - ii. Facilities (mention available facilities)

- Residential facilities for teaching and non-teaching staff (give numbers available -- cadre wise) :

Residential facility is available for teaching and non-teaching staff in the hostels

✓
✓

- Cafeteria
- Health centre

- First aid, Inpatient, Outpatient, Emergency care facility, Ambulance -

Health centre staff –

Qualified doctor Full time  Part- time

Qualified Nurse Full time  Part- time

- Facilities like banking, post office, book shops –Yes , ATM and stationery shop
- Transport facilities to cater to the needs of students and staff : Yes
- Animal house - Under Process.
- Biological waste disposal : Yes
- Generator or other facility for management/regulation of electricity and voltage : 850 kVA, 11kV/433V transformer and 500 kVA and 250kVA, 400V stand by generator.
- Solid waste management facility :
- Waste water management : Yes
- Water harvesting –

12. Details of programs offered by the college (Give data for current academic year)

S.No	Programme Level	Name of the Programme/Course	Duration (years)	Entry Qualification	Medium of instruction	Sanctioned/ approved Student strength	No. of students admitted
1	Under-Graduate	B.E. Computer Science and Engineering	4	HSC	English	300	295
2		B.E. Mechanical Engineering	4	HSC	English	240	230
3		B.E. Electronics and Communication Engineering	4	HSC	English	240	228
4		B.E. Electrical and Electronics Engineering	4	HSC	English	180	161

S.No	Programme Level	Name of the Programme/Course	Duration (years)	Entry Qualification	Medium of instruction	Sanctioned/ approved Student strength	No. of students admitted
5		B.Tech. Biotechnology	4	HSC	English	120	122
6		B.Tech. Information Technology	4	HSC	English	120	120
7		B.E. Bio-Medical Engineering	4	HSC	English	120	119
8		B.E. Civil Engineering	4	HSC	English	120	117
9		B.E. Automobile Engineering	4	HSC	English	60	53
10		B.E. Mechatronics Engineering	4	HSC	English	60	53
11		B.E. Aeronautical Engineering	4	HSC	English	60	46
12	Post-Graduate	MBA – Master of Business Administration	2	Any Degree	English	120	109
13		MCA – Master of Computer Applications	3	BCA, B.E, M.Sc., B.Sc., B.Com.	English	60	45 (Lateral Entry)
14		M.E. – Communication System	2	B.E./ B.Tech.	English	18	13
15		M.E. – Computer Science and Engineering	2	B.E./ B.Tech.	English	24	10
16		M.Tech.– Bio Technology	2	B.E./ B.Tech.	English	18	8
17		M.E. – Embedded Systems	2	B.E./B.Tech.	English	18	8
18		M.E. – Medical Electronics	2	B.E./ B.Tech.	English	18	7
19		M.E. – Engineering Design	2	B.E./ B.Tech.	English	18	6
20		M.E. – Power Electronics and Drives	2	B.E./ B.Tech.	English	18	4
21		M.E. – Software Engineering	2	B.E./ B.Tech.	English	18	1
22	Ph. D.	Mechanical, EEE, ECE, CSE, IT, Biotech, Biomed, Maths, Chemistry		PG degrees in the respective discipline	English		4

13. Does the college offer self-financed Programs?

Yes  No

If yes, how many?

14. New programs introduced in the college during the last five years if any?

Yes

Programme	Number
UG	1
PG	3
Ph.D	4

15. List the departments (respond if applicable only and library physical education as departments, unless they are also offering academic degree awarding programmes. Similarly, do not list the departments offering common compulsory subjects for all the programmes like English, regional languages etc.)

Particulars	UG	PG	Research
Science			
Chemistry, Mathematics			Yes
Commerce			
Arts			

16. Number of Programmes offered under (Programme means a degree course like BA, BSc, MA, M.Com...)

- a. annual system
- b. semester system
- c. trimester system

21

17. Number of Programs with

- a. Choice Based Credit System
- b. Inter/Multidisciplinary Approach
- c. Any other ( specify and provide details)

21

18. Does the college offer UG and/or PG programmes in Teacher Education?

Yes  No

19. Does the college offer UG or PG programme in Physical Education

Yes  No

## 20. Number of teaching and non-teaching positions in the Institution

Positions	Teaching Faculty						Non-teaching Staff	Technical Staff		
	Professor		Associate Professor		Assistant Professor					
Sanctioned by the UGC /AICTE University / State Government <i>Recruited</i>	Not Applicable									
<i>Yet to recruit</i>	-									
Sanctioned by the Management/society or other authorized bodies	46		63		299		87		74	
	M	F	M	F	M	F	M	F	M	F
<i>Recruited</i>	31	15	33	30	129	170	57	30	56	18
<i>Yet to recruit</i>	-									

. \*M-Male \*F-Female

## 21. Qualifications of the teaching staff:

Highest qualification	Professor		Associate professor		Assistant professor		Total
	Male	Female	Male	Female	Male	Female	
<b>Permanent teachers</b>	<b>31</b>	<b>15</b>	<b>33</b>	<b>30</b>	<b>129</b>	<b>170</b>	<b>408</b>
D.Sc./D.Litt	-	-	-	-	-	-	-
Ph.D.	28	15	11	5	2	11	72
M.Phil.	-	-	2	7	22	39	70
PG	3	-	20	18	105	120	266
<b>Temporary teachers</b>	NIL						

## 22. Number of Visiting Faculty /Guest Faculty engaged with the College. [2]

## 23. Furnish the number of the students admitted to the college during the last four academic years.

Categories	2012-13		2013-14		2014-15		2015-16	
	Female	Male	Female	Male	Female	Male	Female	Male
BC	212	366	225	412	242	406	288	484
MBC/DNC	71	144	75	141	83	129	91	161
OC	138	185	146	178	135	207	155	211
SC	40	75	62	72	48	79	53	97
ST	2	2	1	2	1	2	0	4
Total	463	772	509	805	509	823	587	957

24. Details on students enrollment in the college during the current academic year:

Type of students	UG	PG	M.Phil.	Ph.D.	Total
Students from the same state where the college is located	1531	208	NA	4	1743
Students from other states of India	12	3	-	-	15
NRI students	1	-	-	-	1
Foreign students	-	-	-	-	-
Total	1544	211	-	4	1759

25. Dropout rate in UG and PG (average of the last two batches)

UG	<1%	PG	<2%
----	-----	----	-----

26. Unit Cost of Education

(Unit cost = total annual recurring expenditure (actual) divided by total number of students enrolled )

a) including the salary component	Rs.1,03,145
b) excluding the salary component	Rs.63,346

27. Does the college offer any programme/s in distance education mode (DEP)?

Yes  No

28. Provide Teacher-student ratio for each of the programme/course offered:  
1: 15 for the all the programmes

29. Is the college applying for  
Accreditation : Cycle 1  Cycle 2  Cycle 3  Cycle 4

Re-Assessment:  (Cycle 2)

*(Cycle 1 refers to first accreditation and Cycle 2, Cycle 3 and Cycle 4 refers to re-accreditation)*

30. Date of accreditation\* (applicable for Cycle 2, Cycle 3, Cycle 4 and re-assessment only)  
Cycle 1: 31-3-2007 Accreditation Outcome/Result B grade (70.9)

Cycle 2: (08/12/2013) Accreditation Outcome/Result B grade (2.71)

**Refer Annexure 9 – Accreditation Certificate**

**Refer Annexure 10 – Peer Team Report**

31. Number of working days during the last academic year.  
265
32. Number of teaching days during the last academic year 192  
*(Teaching days means days on which lectures were engaged excluding the examination days)*
33. Date of establishment of Internal Quality Assurance Cell (IQAC)  
IQAC 02-05-2007
34. Details regarding submission of Annual Quality Assurance Reports (AQAR) to NAAC.  
AQAR (i) 4-10-2010  
AQAR (ii) 27-1-2012  
AQAR (iii) 27-01-2012  
AQAR (iv) 27-03-2012  
AQAR (v) 25-09-2013  
AQAR (vi) 5-05-2015
35. Any other relevant data (not covered above) the college would like to include. (Do not include explanatory/descriptive information)

The institution is ISO 9001:2008 certified by TUV, NORD, GERMANY for maintaining academic standards:

**Refer Annexure 11**

## CRITERION I: CURRICULAR ASPECTS

### 1.1 Curriculum Planning and Implementation

#### 1.1.1 State the vision, mission and objectives of the institution, and describe how these are communicated to the students, teachers, staff and other stakeholders.

**VISION:**

To be an institution of excellence in Engineering, Technology and Management Education and Research. To provide competent and ethical professionals with a concern for the society.

**MISSION:**

To impart quality technical education imbued with proficiency and humane values. To provide right ambience and opportunities for the students to develop into creative, talented and globally competent professionals. To promote research and development in Technology and Management for the benefit of the society.

**The goals and objectives of the college are as follows:**

- To deliver the curriculum prescribed by the University in the best manner and to ensure that the students graduate with Anna University degree with a high CGPA.
- To maintain the teaching-learning process innovative, interactive and in-depth and to ensure an effective relationship between the curricular content and practical applications.
- To provide excellent academic ambience to the students and to identify and take care of the performance of every student.
- To promote and maintain a serene campus with a scientific fervor.
- To promote co-curricular and extra-curricular activities for overall development of the students.
- To provide appropriate value addition programmes, international certification programmes and to bridge the gap between academia and industry and to make the students globally competent and employable.
- To promote R & D activities and kindle creative thinking of the students and to encourage their innovative ideas and projects.
- To provide a forum to imbibe ethical practices with a concern for the society.
- To develop knowledgeable and responsible citizens for participating in nation building activities.
- To strive for continuous improvements in all the institutional endeavors.

**The vision and mission of the college are made known to the students, teachers, staff and other stakeholders through:**

- College website
- College prospectus, Calendar, College magazine
- Distribution of CDs containing the College profile

- Participation in Education Fairs organized by Anna University / Madras University etc.
- Programmes telecast in Television
- Posters within the campus
- Distribution of information brochures
- Sending information to other institutions of higher learning
- Career counseling programs for school children
- Students' Orientation programmes
- Boards displayed at strategic locations within the campus.

**1.1.2 How does the institution develop and deploy action plans for effective implementation of the curriculum? Give details of the process and substantiate through specific example(s).**

The College is affiliated to Anna University and the curriculum and syllabi prescribed by the university are strictly adhered to. Apart from this prescribed curriculum, the College has strategised ways and means to strengthen the teaching-learning process in the following ways:

- Advance planning of Academic activities and calendar in alignment with the University issued Calendar of Events
- Formulation of objective driven teaching plan at the beginning of the semester
- Preparation of adequate learning materials (resources)
- Updated library facilities with e-journals
- Maintenance of course files by all faculty members which contain lesson plan, notes of lesson, question bank and performance details of the students
- Conduct of two Unit Tests and one model examination in each semester as per the academic calendar
- Conduct of remedial classes for the slow learners
- Adopting new and innovative teaching techniques, in addition to the traditional lecture method to get the students actively involved in the teaching learning processes and employing learner centric techniques such as web related assignments, peer learning, group discussion, use of NPTEL lectures, case studies, projects, surveys, quiz etc., in the delivery of the academic courses
- Entrusting the teaching faculty with the task of mentoring 15 students on academic and personal issues, thereby strengthening the bond between teachers and students, leading to a better learning atmosphere
- Provision of well ventilated and spacious class rooms
- Organizing suitable guest lectures and industrial visits to improve the effectiveness of implementation of the curriculum designed and specified by Anna University

For example:

- The students of Electrical and Electronics Engineering attended a sequence of lectures delivered by experts from TANGEDCO (Tamil Nadu Generation and Distribution Corporation on subjects closely related to Power Systems in the curriculum).

- The students of Aeronautical Engineering visit IIT Kanpur for FLIGHT TRAINING program. The training session includes flying and learning the details of aircraft performance, stability and control.

**Academic Calendar for the odd semester year 2015-16**

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
<b>June</b>		1	2	3	4	5	6
	7	8	9	10	11	12	13
	14	15	16	17	18 (III & IV yr)	19	20
	21	22	23	24	25 (II yr)	26	27
	28	29	30	1	2	3	4
<b>July</b>	5	6	7	8	9	10	11
	12	13	14	15	16	17	18
	19	20	21	22	23	24	25
	26	27	28	29	30	31	1
<b>August</b>	2	3	4	5	6	7	8
	9	10	11	12	13	14	15
	16	17	18	19	20	21	22
	23	24	25	26	27	28	29
<b>September</b>	30	31	1	2	3	4	5
	6	7	8	9	10	11	12
	13	14	15	16	17	18	19
	20	21	22	23	24	25	26
	27	28	29	30	1	2	3
<b>October</b>	4	5	6	7	8	9	10
	11	12	13	14	15	16	17
	18	19	20	21	22	23	24
	25	26	27	28	29	30	31
<b>November</b>	1	2	3	4	5	6	7
	8	9	10	11	12	13	14
	15	16	17	18	19	20	21
	22	23	24	25	26	27	28
<b>December</b>	29	30	1	2	3	4	5
	6	7	8	9	10	11	12
	13	14	15	16	17	18	19
	20	21	22	23	24	25	26
	27	28	29	30	31		
	Reopening date III & IV YR				Parent Teacher Meeting		
	Reopening date II YR				Commencement/End of Online feedback		
	Testing week				General Counseling		
	UT / Model				Class suspended		
	Govt. Holiday						
	Saturday						
	Working day						

### 1.1.3 What type of support (procedural and practical) do the teachers receive (from the University and/or institution) for effectively translating the curriculum and improving teaching practices?

Anna University to which the institute is affiliated, sponsors Faculty Development Programmes on subjects listed in the curriculum during summer and winter vacation periods, where the teachers can strengthen their knowledge in those subjects and also learn the methodology of effectively teaching them.

#### **In addition the Institution provides**

- Teaching aids such as LCD, OHP and computers with internet facilities.
- Course management system through [www.moodle.rajalakshmi.org](http://www.moodle.rajalakshmi.org) introduced for providing learning material and conducting online tests.
- Seven modules such as Six sigma, successful innovation etc, developed by Federation of Indian Chamber of Commerce and Industries (FICCI) hosted in college intranet to promote professional excellence.
- CAMS and SUPER software to monitor students' attendance and academic performance.
- Facilities for the participation of faculty members in workshops, seminars, conferences, etc to enrich their knowledge. This provision is also based on the input taken from the students during the middle of the semester and also at the end of the semester.
- Provision of digital libraries, E-learning facilities to all the faculty members of the institution which help them in delivering good lectures.
- Wi-fi and Internet facility made available throughout the campus for better teaching learning process.
- Several innovative orientation programs in the institute to improve the skills of the faculty.
- To enhance the practical knowledge of the teachers with which they can transform the students as industry ready professionals by enabling consultation with Senior Professors, liaison with industries and R&D Institutions.
- Guest lectures by eminent personalities from various reputed institutions and also industries. This will help the faculty members to keep abreast of the latest developments in their fields of specialization and also to identify critical issues in the teaching learning processes and effectively implement them for the benefit of the student community.
- Lectures on research methodologies by eminent academicians to promote research activities in the departments and also to enrich their potential to guide students' projects.
- Faculty Sabbatical to Industry
- REC is a remote centre for the conduct of FDPs under Ekalavya e-OUTREACH PROGRAM sponsored by MHRD as a part of National Mission on Education through Information and Communication Technology (NMEICT). More than 20 programmes have been conducted by the various departments.

The institute has received special grants/ facilities from the following industries and funding organizations for developing following research facilities:

- **TIFAC CORE:** TIFAC CORE on MACHINE VISION was established in the year February 2009. It was funded by Department of Science & Technology, the Government of India, with an outlay of Rs. 5.15 crores.
- **IBM Centre of excellence:** A joint lab facility with IBM was established in the year 2011.
- **Unified Technology Learning Platform [UTLP]** Lab facility in Embedded systems was created by the Institute in 2013 with a funding of Rs.15 lakhs, in collaboration with WIPRO Technology. Faculty members of REC in the field of Embedded Systems are trained by the experts of WIPRO time to time on the latest technology updates. In turn these faculty members train the students of REC periodically. This training is offered to students of other institutions also during summer/winter vacation.
- **Robotics Lab:** Robotics lab was established in 2010 to train the students and the faculty in the field of advancement in Robotics and the training programs are conducted by LEMA LABS a company incubated by IIT Madras, Chennai.
- **Bosch:** The Institute has jointly established a state-of-art training centre on Automotive technology with BOSCH, for an outlay of Rs. 70 lakhs, in 2012 to conduct Joint certification programs for students.
- **MODROBS:** Lab facilities in the Department of Mechanical Engineering for Rs. 5.15 lakhs and in the Department of Electronics and Communication Engineering for Rs.14 lakhs have been modernized under the AICTE MODROBS grant.
- **Clean Room:** A state of the art ‘clean room’ is also being created with Class 1000 and 10,000 specifications at a cost of 45 lakhs in the college, enhancing semi conductor fabrication and embossing techniques.
- **National Mems Design Centre -A National MEMS Design Centre (NMDC)** at the institute has been established under National Program on Micro and Smart Systems (NPMASS) for the benefit of users from the region. REC motivates the research activity in the field of MEMS utilizing the facilities provided by NPMASS from design to fabrication of prototype MEMS products and specific field applications. REC also facilitates external researchers from other interested institutes (academic or National Labs subject to individual software licensing conditions) to use the design tools.

#### **The institute organizes**

- WIPRO MISSION 10X teaching methodology programmes
- Pedagogical training to teachers by senior academicians
- Orientation programmes for newly recruited teachers

#### **The institute grants**

- On duty permission for Ph.D. , FDP, workshops and seminars
- Seed money for registration and travel to participate in seminars and conferences through KMC (Knowledge Management Cell)
- Sabbatical leave for faculty members for knowledge enrichment

#### 1.1.4 Specify the initiatives taken up or contribution made by the institution for effective curriculum delivery and transaction on the curriculum provided by the affiliating University or other statutory agency.

For an effective teaching learning process a learner centric pedagogy is practiced in the following ways:

- Subject allotment based on proficiency matrix, experience and performance in previous years.
- Time table framed with provision for Value Added Programmes (VAP), seminar and library hours.
- Preparation of proper lesson plan, notes on lesson, question bank, lab manuals well in advance and posted on the website.
- Monitoring of course delivery and syllabus completion through formal and informal feedbacks.
- Systematic examination process, standard question papers, proper and prompt evaluation and dispatch of reports to parents.
- Availability of CAMS, SUPER, and MOODLE softwares to monitor and aid students' performance and teaching and evaluation processes.
- Guest lectures, seminars, Industrial visits and training programmes to supplement the curricular inputs.
- Refresher courses, workshops, FDPs for skill upgradation of faculty.
- Provision of infrastructure facility (eg. well established labs and workshops)
- Encouraging students to do innovative project work of national interest through Innovative Project Cell.
- Motivating students for doing research work and present papers in seminars and conferences and publish in journals.
- Bridging Industry –Institution gap with suitable value added programmes which are part of the regular time table.
- Adopting “**outcome based approach**” for the effective delivery of the curriculum. Even the pattern of setting of the question papers for the internal tests is so designed to facilitate the assessment of the attainments of the course outcomes for the various courses.

#### 1.1.5 How does the institution network and interact with beneficiaries such as industry, research bodies and the university in effective operationalisation of the curriculum?

The institution networks and interacts with other bodies in the effective operationalisation of the curriculum and other related activities in the following ways:

- The institute has established relation with various industries through specific activities with defined outcomes for each of these activities as given in the Table 1.1

**Table 1.1**

<b>S.No.</b>	<b>Name of the Industry</b>	<b>Areas of Collaboration</b>
1	TCS	- Guest Lectures, FDPs, - Technology Appreciation Programs - Best Student Project Award - Best Outgoing Student Award
2	BSNL	- Student training - Guest lectures
3	SUPER AUTO FORGE	TIFAC - Industry Partner
4	IGCAR	- Corrosion detection - Nano- sensors
5	VALEO	- HVAC
6	DEFIANCE	- Combustion studies - Emission studies
7	HITACHI SOLUTIONS	Training & Strategic hiring
8	ABAN	- Improvement in downstream process - Bio product development
9	MANDO	Skill Enhancement
10	INFOSYS	Campus Connect
11	HITACHI	Training & Hiring
12	EMC	Academic Alliance
13	IIT ALUMNI	PALS lecture series
14	SAIL	Management Development Program
15	IGCAR	Non Destructive Testing
16	CII	Education Excellence Forum

- The college has established centres of excellence in collaboration with industries to offer specialized training programmes in specific areas as shown in Table 1.2

Table 1.2

S.No.	Name of the Centre	Partnering industry	Area of training
1	IBM Centre of Excellence	IBM	RAAD, RATIONAL ROSE, DB2
2	BOSCH Training Centre	BOSCH	Diesel pumps, Engine analysers, A/C recharging, Auto Electricals
3	UTLP Centre	WIPRO Limited	Embedded systems- ARM, FPGA
4	LEMA LAB	IIT Madras	Basics of Robotics
5	THINK LABS	IIT Bombay	Embedded Technology

- Institution is also accredited by TCS, CTS and Wipro Technologies.
- The College has been recognized as 'Centre of Excellence' in automobiles by Ashok Leyland.
- The feedback from the students periodically helps to understand the problems that arise from time to time in the teaching-learning process and to take remedial measures. It also helps in arranging suitable guest lectures by industrial experts on topics of current interest in various specialisations and In plant training for the students.
- Students are taken for industrial visits to expose them to the present industrial practices relevant to their branch of study.
- Certain groups of students take up projects in industries appropriate to their branch of study and students of Biomedical Engineering visit hospitals and take associated projects.
- Faculty members take up Industrial training during semester end vacation periods to learn and teach the students the current industrial practices.
- Experts are also invited from industries as judges for the quality assessment of students' projects.

#### **Research recognition /grants/ students' external projects**

- The college is recognized by the Department of Scientific and Industrial Research (DSIR) Govt. of India, as Scientific and Industrial Research Organization (SIRO), in 2009 and subsequently renewed in 2012.
- The institution receives grants from research bodies such as DST, AICTE, DRDO, ICMR etc.
- Students take up projects in reputed Research Institutes such as Central Leather Research Institute, Chennai; Indian Institute of Science, Bangalore; Central Food and technological Research Institute, Mysore; M.S. Swaminathan Science Research Foundation, Chennai etc.

#### **University and other educational Institutions**

- Eminent faculty of the institution are members of various Boards of studies, Syllabus Committee, Academic Council and Syndicate of the University and they take active

- part in curriculum revision and in the discussions relating to the implementation of various other academic activities and examination systems.
- University sponsors FDPs specifically on subjects given in the curriculum during winter and summer vacation periods through its separate Centre for Faculty Development.
  - Principal and the IQAC members participate in the meetings organized by other institutions for discussing the functioning of IQAC.
  - University also facilitates the faculty, through its Anna University Quality Circle, to attend webinar programmes on Soft skills, conducted by IIT Bombay.
  - Similar to NPTEL lectures, University also telecasts through satellite, subject lectures by experienced teachers.

**1.1.6 What are the contributions of the institution and/or its staff members to the development of the curriculum by the University?(number of staff members/departments represented on the Board of Studies, student feedback, teacher feedback, stakeholder feedback provided, specific suggestions etc.**

The curriculum designed by the affiliating University is adequate and it is dynamic. The last revision was done as latest as the academic year 2013-14. However, based on the systematic feedback of the students on course outcomes and alumni on attainment of programme outcomes teachers at the department level discuss the curriculum threadbare and through the members, Board of Study, the required and suitable changes are recommended to the concerned bodies.

**Details of the faculty of the College who are on the Syndicate/BoS/Academic Council/Syllabus Committee of the University:**

S.No	Name of the Faculty	Position	Committee/Body
1.	Dr.G.Thanigaiyarasu	Member	Syllabus Committee
2.	Prof. S. Renganarayanan	Member	Syndicate, Anna University
3.	Dr. M. Subbiah	Member	Academic Council, Anna University
4.	Dr. Johanna Rajkumar	Member	Syllabus Committee
5.	Prof. M. Muthusamy	Member	Syllabus revision committee
6.	Dr. S.Selvaraju	Member	Syllabus revision Board, Anna University of Technology
7.	Dr. S. Sampath	Member	Board of studies Anna University
8.	Dr. K. Baskar	Member	Board of studies Anna University

**1.1.7. Does the institution develop curriculum for any of the courses offered (other than those under the purview of the affiliating university) by it? If ‘yes’, give details on the process (‘Needs Assessment’, design, development and planning) and the courses for which the curriculum has been developed.**

The curriculum is as per the affiliating University. But wherever there is a gap in the curricula of the University and the requirements of the industries, employability and higher education, suitable training programs are planned and developed by the Training and Placement Cell and the respective departments and imparted to the students. A few of the programmes developed for our own students are:

- Soft skill development
- Technical skill development
- Global Certification courses
- Entrepreneurship Centre
- Bosch training program
- Image processing techniques

For industrial collaborators

- Skill Enhancement Programme for Mando India Ltd., Chennai  
Stress

Details of some of the Certificate courses organised during 2014-2015

S.No	Name of the Course/Training Program	Partnering Agency/industry/institution	Duration
1	Microsoft SQL, .NET, Windows server	Digiterati	21.06.2014 to 27.06.2014
2	EETP	BSNL - Silver and Platinum	15.07.2014
3	Kaizen Robotics	Lema Labs	09.08.2014 to 20.09.2014
4	Cloud Infrastructure	ICTACT & EMC <sup>2</sup>	26.07.2014 to 27.08.2014
5	IT Help desk	CISCO	11.08.2014 to 06.09.2014
6	BSNL-EETP - Gold Certification	BSNL	19.01.2015 to 25.04.2015
7	Big Data	REC	07.02.2015 to 21.03.2015
8	Sustainable Buildings	EN3	21.02.2015
9	Advanced systems in Automobile Engineering	REC	26.02.2015 to 28.02.2015
10	PC Assembly and Troubleshooting	REC	23.03.2015 to 24.03.2015

### 1.1.8. How does institution analyze/ensure that the stated objectives of curriculum are achieved in the course of implementation?

The institution follows an ‘**outcome based approach**’ in the teaching-learning-evaluation processes. Every programme frames a set of about ten **Programme Outcomes** based on the graduate attributes concerning that specific programme. – The University syllabus for every course in a programme is divided into five units and five **Course Outcomes**, one for each unit have been arrived at. Further, for enabling an easy **direct assessment** of attainment of these five course outcomes, the internal examination question paper patterns and assignments for each course are suitably framed and marks are awarded. The percentage of students getting more than 50 % of the marks allotted for any course outcome is taken as a measure of its attainment. Apart from the direct assessment, indirect assessment methods are also adopted.

The institution has formed communication channels among all the stakeholders to ensure that objectives of the curriculum are achieved in the course of implementation. The methods followed to ensure the achievements of stated objectives are:

- Preparation of competency matrix and allotment of subjects based on the expertise and experience of the teachers.
- The institution compares content given in the courses delivered and the inputs from the alumni employed in industries.
- Attainment of course objectives and outcomes is evaluated through a feedback obtained from the students.
- Class Committee meetings are conducted (one meeting at the end of every unit test) to improve the teaching learning process. Corrective and preventive actions are taken whenever required.
- Faculty members attend appropriate Faculty Development Programmes organised within and outside the college to become familiar with the newly added advanced syllabus topics.
- Student performance is analysed by the IQAC and suitable strategies, drawn besides the exit feedback of the outgoing students that has formed the basis for devising appropriate strategies. Feedback from the industry representatives is also obtained for various corrective measures.

It is observed that by the implementation of the aforesaid methodologies, the specified objectives of the curriculum are met as stated below:

- Most of the students achieve good marks in their university examinations. The college also secures good number of university ranks.
- Students of the institution achieve success in various inter-college and intra-college competitions.
- The alumni of the institution are securing top positions in different organisations/institutions.
- Periodic assessment is made to analyze goal implementation and target realization to ensure that the Institution marches towards achieving its stated mission and vision.

## 1.2 Academic Flexibility

### 1.2.1 Specifying the goals and objectives give details of the certificate/diploma/ skill development courses etc., offered by the institution.

#### Goals and Objectives – Refer 1.1.1

1. **Value Added Programs are arranged to bridge the knowledge gap between academia and industry and to strengthen the regular academic programmes prescribed by the University**
  - International Certification Programmes (SCJP, CCNA, CFX)
  - Microsoft Certification Program (DOT NET, ORACLE, WINDOW SERVER, SQL)
  - Certification Program in Total Quality Management
  - Embedded System Certification Program
  - Automobile Society Orientation Program
  - Bosch training program
  - Kaizen Robotics Program
  - Specialized CAD/CAM Training
  - IBM software training programs
  - Aircraft maintenance programs
  - Employability Training Programs
  - STEM cell activities
2. **The gap between curriculum and the best industrial practices are bridged through**
  - Formation of Innovative Project Cell
  - Arranging hands on training sessions
  - Industrial visits and in plant training
3. **Ethical standards are inculcated through**
  - Lectures arranged by the Ethics club
  - Lectures by eminent personalities on moral values
4. **Students are moulded to serve the society through**
  - NSS, YRC, SIFE/ENACTUS and ROTARACT programmes
  - Yuvasakthi activities.
5. **Research and Consultancy activities are promoted by**
  - Research and Consultancy Advisory Board
  - Innovative Project Cell
  - Research project Proposal scheme of AICTE

**1.2.2 Does the institution offer programmes that facilitate twinning /dual degree?****If ‘Yes’, give details.**

No. The College at the moment does not offer any twinning or dual degree program.

**1.2.3 Give details on the various institutional provisions with reference to academic flexibility and how it has been helpful to students in terms of skills development, academic mobility, progression to higher studies and improved potential for employability**

**Range of Core / Elective options** : 4 to 6 Electives offered [UG]

- **Choice based credit system and range of subject options** : As per Anna University
- **Courses offered in modular form** : Each course consists of 5 Units
- **Credit transfer and accumulation facility** : As per Anna University
- **Lateral and vertical mobility within and across programmes and courses:**
  - Lateral entries permitted for students who complete diploma to pursue their engineering degree from second year.
  - The students are given absolute freedom to move across various disciplines for their project work. The students may choose their project guide from any department of the college and can also use any laboratory equipment available on campus for the purpose of project work/research.
- **Enrichment courses:**  
The college offers certification courses to make the students to get hands on experience to be readily placed in the industry.

**1.2.4 Does the institution offer self-financed programmes? If ‘yes’, list them and indicate how they differ from other programmes, with reference to admission, curriculum, fee structure, teacher qualification, salary etc.,**

Yes. All the programmes offered are self financing. The programs are approved by the AICTE, New Delhi and the institute is affiliated to Anna University, Chennai.

**The courses offered are:****Under Graduate Courses**

- B.E. Computer Science & Engineering
- B.E. Electronics & Communication Engineering
- B.E. Mechanical Engineering
- B.E. Electrical & Electronics Engineering
- B.E. Aeronautical Engineering
- B.E. Biomedical Engineering
- B.E. Automobile Engineering
- B.Tech. Information Technology
- B.Tech. Biotechnology
- B.E. Civil Engineering
- B.E. Mechatronics (2015-16)

### Post Graduate Courses

- M.E. Engineering Design
- M.E. Computer Science & Engineering
- M.E. Software Engineering
- M.E. Communication Systems
- M.E. Power Electronics & Drives
- M.E. Embedded Systems
- M.E. Medical Electronics
- M.Tech. Biotechnology
- M.B.A. Master of Business Administration (2 years)
- M.C.A. Master of Computer Applications (3 years)

### Admission

The admission process is based on the policies and guidelines provided by the Anna University.

### Curriculum

The curriculum is designed by Anna University and implemented by the college through well designed teaching-learning processes.

### Fee structure

The fees for all the courses are fixed as per Anna University norms. First generation graduate scholarships and State/Central government Scholarships are made available. In deserving cases tuition fee is waived.

**Teacher qualification and salary** - as per AICTE norms

### 1.2.5 Does the college provide additional skill oriented programmes, relevant to regional and global employment markets? If 'yes' provide details of such Programme and the beneficiaries.

Yes.

Name of the program	Beneficiaries
❖ Employability Training Camps	- All UG, MBA and MCA students
❖ BEC-MBA Training	- MBA students
❖ Personality Development Programmes	- All UG and MCA students
❖ Debate	- Third years (All branches)
❖ Online Aptitude Programmes	- Final years(all branches)
❖ Spoken English courses	- First year vernacular medium and lateral entry students
❖ Certification programmes	- Third and Final years(All branches)
❖ Robotics	- Second and third years Auto, Aero, Mechanical, ECE and EEE students
❖ Bridge courses	- First years (All branches)
❖ Think Labs, Robotics lab	- Available to all students
❖ Value Added programmes	- For all third years
❖ MEMS courses	- Interested group of students

**1.2.6 Does the University provide for the flexibility of combining the conventional face-to-face and Distance Mode of Education for students to choose the courses/combination of their choice” If ‘yes’, how does the institution take advantage of such provision for the benefit of students?**

No. The affiliating University does not offer such a facility as of now.

**1.3 Curriculum Enrichment**

**1.3.1 Describe the efforts made by the institution to supplement the University’s Curriculum to ensure that the academic programmes and Institution’s goals and objectives are integrated?**

To ensure that the academic programs meet the institution’s goals and objectives, the following initiatives are taken to supplement the university curriculum.

- The institute follows outcome based approach and measures the level of attainment of outcomes for all the academic activities quantitatively. Appropriate Value Addition Programmes are planned based on the analysis of level of attainment of various programme outcomes. A dedicated **Training and Placement Cell** works in tandem with academic departments and ensures that these Value Addition Programmes are implemented effectively.
- All departments identify the gaps in the curriculum and include additional topics in the theory and experiments in lab courses to bridge the gaps.

For example, following additional topics and experiments are given in the some of the departments are given below:

S. No	Theory/ Lab	Topic	Activity
1	Biochemistry	Physical properties of water	Demonstration and role play
2	Cell Biology	Organisation of chromosomes	Model and demonstration
3	Enzyme Technology and Biotransformation	Immobilisation of enzyme in alginate and chitosin beads	Practical demonstration
4	Bioprocess Technology	Treatment of industrial effluents	Designing of Bioreactors
5	Molecular Biology	Isolation of DNA	Isolation of DNA from strawberries using salt and shampoo
6	Heat Transfer	Jet impingement cooling	Lab demonstration
7	Wind Energy Electric Conversion	Capacitor excited induction generators	Lab demonstration

- Guest lectures, Seminars, Workshops, Training programme and industrial visits are arranged to create awareness on the current demands of industry.

As a sample, the details of Guest Lectures Conducted by Department of Mechanical Engineering in the year 2014-15 is given:

S.No.	Date	Topic	Name of the speakers with designation and organization
1	10/07/2014	Recent trends in CAD / CAM	Mr.Sikandhar, CAD / CAM Solutions, Design Extrude
2	04/08/2014	Basics of HVAC	Mr.D.Balaji HVAC Consultant, ISHARE
3	14/08/2014	Supply Chain Management	TAB. Bharathi and M.Sundaram, IIMM, Chennai
4	08/08/2014	Overview about Nuclear Power Plant	Dr.G VAIDYANATHAN B.Sc. Engg, MBA, Ph.D., Retired Director(Fast Reactor Tech Group) IGCAR, Kalpakkam
5	16/09/2014 & 22/09/2014	All about HVAC	Mr.D.Balaji, HVAC Consultant, ISHRAE
6	9/10/2014	IIIE (Student Chapter Inauguration) Lecture on Wheels	Mr.Badrinarayanan, General Manager, R&D Wheels India Pvt Ltd.
			Mr.Kamala Kannan, Manager, Ashok Leyland
			Mr.Krishnamoorthy, Past Chairman, IIIE
7	11/10/2014	Welding Technology	Mr.M.A.Inbarasu
			Chief Mechanical Engineer, Planning , Southern Railway,ICF
			Mr.V.Muralidharan
			Chairman Indian Institute of Welding, Ennappan Consultants
8	20/01/2015	KAIZEN	Prof.D.Kiran
			NIQR
9	12/03/2015	Modern Meshing Methods and Core Capabilities (Webinar)	James Clement
			Product Manager, STAR-CCM+

- Assignments are given on all the subjects, in addition to arranging group discussions, written/oral tests, quiz, role play, etc.
- The College gives importance to Spoken English classes to inculcate good communication skills among students.

- Educational tours are organized for industrial visits and also to develop interpersonal relationships and to create awareness on the rich heritage and culture of our country.
- Various academic competitions like technical symposium, innovative project design contest are conducted for all round development of the students.
- Various short term programmes are organized by the college to supplement the curriculum to enhance students' employability.

**Details of the few activities of Employability Training Camp Organised during 2014-15 is cited below**

S. No	Date	Topic	Company's name	Trainer's name	Dept	Audience	No. of participants	Venue
1	17.11.2014	Assessing cancer risk with a blood test	University of Bradford	Ms. Diana Anderson	BT, BME	PG students	100	Mini Seminar hall
2	08.02.2015	TCS Fit for Life Run	TCS	-	All dept	Final and 3 <sup>rd</sup> year students	625	TCS, Siruseri
3	6.6.2014-12.6.2014	Aptitude Training	Salka, Gyaana, Digiterati	Mr. Roy Anand, Mr. M. Padmanabhan	Aero, Auto, BME, CSE, EEE, Civil	3 <sup>rd</sup> year students	267	Seminar hall
4	14.6.2014-20.6.2014	Aptitude Training	Salka, Gyaana, Digiterati, Prerana	Mr. Roy Anand	Biotech, IT, ECE, Mech, MCA	3 <sup>rd</sup> year & PG students	364	Seminar hall

- The College library is well stocked with books, journals, back volumes, e-books and e-journals. A library hour within the class time table is provided to encourage library usage by students. The Library is kept open from 7.30 a.m to 7.30 p.m from Monday to Saturday.
- Additional facilities are provided in labs beyond University prescribed experiments to enable students to carry out mini-projects, with guidance from teachers.
- The Centre for Fostering Social Responsibility consists of several units such as Enactus, Rotaract club, NSS, Youth Red Cross, REC Exnora is functioning very effectively to ensure that the students graduating from REC have concern for society as stated in our vision. Through this centre students and faculty members are actively participating in different community development projects ranging from Green Campus project to Swatch Bharat Abhiyan.

### 1.3.2 What are the efforts made by the institution to modify, enrich and organize the curriculum to explicitly reflect the experiences of the students and cater to needs of the dynamic employment market?

- The college adheres to the syllabus designed by Anna University and the faculty enrich it with their own expertise and experience to enable students compete in the job market.
- Provision for special lectures, Industrial visits, in-plant training and innovative project cell competitions have been put in place.
- The college regularly organizes communication skills and life skill development programmes.
- Training and Placement Cell takes initiatives to cater to the needs of the changing employment market. The Cell regularly interacts with the HR managers of companies and collects first hand information about the demands and expectations of the corporate sectors regarding the required skill set of students. Based on these, special training and tailor made value added programmes are conducted during the academic year.
- The students are encouraged to take up mini projects and main projects in thrust areas. If necessary, students are sent to industries or research organizations to collect the data, do the necessary design and analysis and suggest solutions for the technical improvement and cost effectiveness.
- The College organizes, the campus connect programmes in collaboration with TCS so that students can map their theoretical knowledge into practical implementation.
- Alumni feedback is taken periodically to understand the curricular gaps and recent market trends.

### 1.3.3 Enumerate the efforts made by the institution to integrate the cross cutting issues such as Gender, Climate Change and Environmental Education, Human Rights, ICT etc., into the curriculum?

The institution is adopting Anna University curriculum. The efforts made by the institution to integrate the cross cutting issues such as Gender, Climate Change, Environmental education, Human Rights, ICT etc are as follows:

#### **Gender:**

- Equal opportunities are given to both the genders in terms of admissions, employment, training programmes, sports activities etc., and so gender issues do not arise.
- College supports women faculty and students to become member in forums such as Indian Women Network (IWN) of the Confederation of Indian Industry (CII) and encourages them to participate in events focusing on women empowerment and promoting leadership qualities in women.
- Girls and boys participate in various co-curricular activities such as paper presentations, organization of paper contests, group discussions and technical quiz programmes. Both boys and girls are made members of various clubs associated with academic, co-curricular and extracurricular activities.
- Modules for gender sensitization are also conducted by Women Empowerment Cell both faculty and students on topics such as 'Live life', 'Transactional analysis' which not only emphasize the importance of virtues to be adhered to in life, including

respecting women but also aims at enabling their comfort in the work place and ensuring professional growth.

#### **Climate Change and Environmental Education:**

- Students have a compulsory course on Environmental Science and Engineering.
- Topics related to these issues are taken up for quiz and debates during the National Science Day, Earth Day celebrations and the Independence Day function.
- Students are also encouraged to participate in activities on climate change organized by other institutes.
- They are taken for industrial visits and effluent and water treatment plants and places that will educate them on environmental issues.
- Awareness programmes are also initiated by NSS, YRC, Enactus and Rotaract Club which extensively carry out activities for environmental protection and ecological preservation.

#### **Human Rights:**

- The curriculum includes courses on professional ethics and IPR and human rights.
- Special lectures are also arranged to create awareness on these issues.

#### **ICT:**

- There are computer related theory and practical subjects for all degree courses.
- The lesson plan, notes on lesson, lab manuals and question banks are made available in Moodles at the beginning of the semester. During the course of the semester faculty and students interact among themselves through Moodle.
- There are also softwares to enter and view the students' details, marks, attendance etc.
- Number of certification programmes related to ICT are organized.

#### **1.3.4. What are the various value-added courses/enrichment programmes offered to ensure Holistic development of students?**

##### **Moral and ethical values**

Programmes are offered by Chinmayananda Mission and Ramakrishna Mission. Ethics Club arranges programmes every week to educate moral and ethical values.

##### **Employable and life skills**

Training programmes for personality development, communication skills and employability training camps.

##### **Better career paths**

- Career guidance - Training Placement and Cell
- Library resources
- Guidance by respective departments
- Education fairs

##### **Community orientation**

- NSS, YRC, Rotaract and
- SIFE/ENACTUS activities

### 1.3.5 Citing a few examples enumerate on the extent of use of the feedback from stakeholders in enriching the curriculum?

IQAC cell is effectively functioning in the college with Principal as the Chairman and senior professors and external experts as members. The cell meets periodically and discusses in detail various requirements relating to academic processes in the institution, following primarily the outcome based approach in the teaching, learning and evaluation processes and other major activities of the institution. The assessment of attainment of various outcomes are measured based on the feedback obtained from the stakeholders through appropriately designed questionnaires. IQAC of REC analyses the attainment of these outcomes and accordingly proposes in consultation with HODs, the enrichment of the curriculum by organizing specific training programmes, special lectures, industrial visits and workshops.

For example based on feedback from Infosys and TCS:

- Campus connects and Campus Commune are regularly organized to enrich the curriculum.
- STEM, a Science Technology Engineering and Mathematics Club started based on feedback from the students, to promote interdisciplinary lab practical sessions.
- ATRIUM is started to enable interested students to participate in literary activities and to improve communication and writing skills.

### 1.3.6 How does the institution monitor and evaluate the quality of its enrichment programmes?

- Based on the analysis of the feedback, the institution decides to roll out suitable modules of enrichment programmes
- The quality of enrichment programmes are evaluated by the
  - i) the performance of the students in the internal and university examination,
  - ii) participation in technical quiz competitions,
  - iii) number of innovative projects carried out
  - iv) papers presented in seminars and prizes won
  - v) understanding shown in lab experimentation and answering viva questions.

## 1.4 Feedback System

### 1.4.1 What are the contributions of the institution in the design and development of the curriculum by the University?

- Faculty members from various departments are in the committees concerned with the curriculum design and development of the University (Syndicate, Academic Council, Board of Studies and Syllabus Committee)

Details available in 1.1.6

### 1.4.2 Is there a formal mechanism to obtain feedback from students and stakeholders on Curriculum? If 'yes', how is it communicated to the University and made use internally for curriculum enrichment and introducing changes/new programmes?

Yes. The college has a formal mechanism to obtain feedback on curriculum from students and stakeholders. The IQAC of the college plays a pivotal role in conducting Feedback. Feedback on curriculum is conducted by first semester students as well as the

outgoing students. IQAC also take care of the exit feedback. Industry experts are also brought in by the Institution.

- It is communicated to the University through faculty members who are members of Board of Studies, Academic Council of the university etc.,
- If changes are required, faculty members also take initiatives to write to the university.
- To adopt the revised curriculum, special lectures, FDPs and industrial visits are suitably organized.
- Additional laboratory hours are provided to conduct experiments beyond the syllabus to enrich the practical knowledge of the students.

#### **1.4.3 How many new programmes/courses were introduced by the institution during the last four years? What was the rationale for introducing new courses/programmes?)**

- B.E. Mechatronics Engineering
- M.E. Engineering Design
- M.E. Embedded Systems
- M.E. Medical Electronics
- Ph.D. Bio Medical Engineering
- Ph.D. IT
- Ph.D. Mathematics
- Ph.D. Chemistry
- Many of the production processes, machine operations and automobile control are becoming more and more electronics and processor oriented and hence there is a need for engineering graduates to become familiar with a combination of both mechanical Engineering knowledge and electronic circuits. So, a course on Mechatronics has been started in 2015-16.
- Recognizing the increased need for post-graduate engineers proficient in design of indigenous products by the manufacturing industries, an M.E. programme in Engineering Design was introduced in the academic year 2011-12.
- All the electrical and electronic controllers for innumerable domestic and industrial applications are becoming compact, highly sophisticated and processor based in the form of embedded systems. So, there is good scope for students specializing in this emerging area. So an M.E. Programme on Embedded Systems is being introduced in the academic year 2012-13.
- Medical electronics has become a part of all hospitals which use electronic gadgets from diagnosis to treatment and rehabilitation. Skilled engineers are necessary in this field and so an M.E. programme on Medical Electronics was started in the academic year 2011-12.
- Without research there can be no development. Establishment of research centers will help the institution to promote research in the different areas of Science, Engineering and Technology. Mathematics, Chemistry, Bio Medical Engineering and Information Technology departments have been recognized as Research Centers by Anna University in the last four years to offer Ph.D. / M.S. programmes.

**Any other relevant information regarding curricular aspects which the college would like to include**

Being an affiliated type, the institution uses the curriculum provided by the university. The College makes all possible positive efforts to fill the gap between the existing curriculum and the changing actual needs, by suitably organising course relevant value added programmes.

**CRITERION II****TEACHING – LEARNING AND EVALUATION****2.1 Student Enrolment and Profile****2.1.1 How does the college ensure publicity and transparency in the admission process?**

- The college ensures publicity through prospectus, institutional website and advertisements in leading newspapers.
- The college strictly follows the rules laid down by both the University and Government of Tamil Nadu to ensure transparency in the admission process.
- As the College is affiliated to Anna University, admissions under the Government Quota are made through a Single Window Counseling system by the University.
- Based on Merit, admissions are made under the Management quota, through the Consortium of Self Financing Arts and Professional Colleges, Chennai.

**2.1.2 Explain in detail the criteria adopted and process of admission (i) merit (ii) common admission test conducted by state agencies and national agencies (iii) combination of merit and entrance test or merit, entrance test and interview (iv) any other to various programmes of the Institution.**

- The admission is based on marks obtained in the qualifying exams. As per the rules, for the undergraduate courses, 50% of the seats are reserved and filled through government quota and the remaining 50% of the seats are filled through management quota.
- For the post graduate courses admission for government quota is based on the written test conducted by TANCET/GATE and qualifying exams and for management quota, admission is made through written test conducted by Consortium of Self Financing Arts and Professional Colleges, Chennai.

**2.1.3 Give the minimum and maximum percentage of marks for admission at entry level for each of the programmes offered by the college and provide a comparison with other colleges of the affiliating university within the city/district.**

The minimum and maximum cut off marks at the entry level for the various programmes through single window counseling is as follows for the year 2015-2016

Programme	2015-2016	
	Maximum (out of 200)	Minimum (out of 200)
B.E. CSE	192.0	122.0
B.E. ECE	196.0	138.5
B. Tech. IT	191.8	109.3
B.E. MECH	195.0	135.0
B.E. EEE	194.8	110.0
B.Tech. BT	196.3	149.0
B.E. AERO	192.0	130.0
B.E. AUTO	194.0	143.0
B.E. BME	195.5	143.0
B.E. CIVIL	192.0	119.5
B.E. Mechatronics	192.3	112.0

Comparison with other colleges within the same zone:

Name of the college	Year	Day of first admission in single window counseling	Maximum Cut off at entry level (out of 200)
<b>Rajalakshmi Engineering College</b>	<b>2015</b>	<b>2nd</b>	<b>196-198</b>
Sakthi Mariamman Engineering College		4 <sup>th</sup>	192-194
Sree Sastha Institute of Engineering and Technology		3 <sup>rd</sup>	194-196
DMI College of Engineering		3 <sup>rd</sup>	194-196
<b>Rajalakshmi Engineering College</b>	<b>2014</b>	<b>2<sup>nd</sup></b>	<b>198-199</b>
Sakthi Mariamman Engineering College		7 <sup>th</sup>	186-187
Sree Sastha Institute of Engineering and Technology		7 <sup>th</sup>	188-189
DMI College of Engineering		10 <sup>th</sup>	179-180
<b>Rajalakshmi Engineering College</b>	<b>2013</b>	<b>1<sup>st</sup></b>	<b>198-199</b>
Sakthi Mariamman Engineering College		8 <sup>th</sup>	184-185
Sree Sastha Institute of Engineering and Technology		6 <sup>th</sup>	187-188
DMI College of Engineering		9 <sup>th</sup>	180-181

The data indicates that REC is much sought after by the students seeking admission. Further it is indicative of the qualitative improvement in terms of the intake over a period of time.

**2.1.4. Is there a mechanism in the institution to review the admission process and student profiles annually? If ‘yes’ what is the outcome of such an effort how has it contributed to the improvement of the process?**

Yes there is a mechanism to review the admission process annually.

**Preparation for Admissions**

- Every year, well before the admission, an updated prospectus of the college is published.
- Help desks are set both in the college and in the Administrative office to disseminate information regarding admission to various programmes.
- Special career guidance programmes for the prospective aspirants for professional course are conducted in which expert educational consultants are invited who deliver in detail the admission process, eligibility criteria, job opportunities etc. Experienced teachers from the institution also present to the audience the nature and scope of every engineering programme.
- The college regularly participates and disseminates information to interested public in career guidance exhibitions organised by the affiliating University in collaboration with reputed media partners.
- Advertisement given in national newspapers.

**Review of Admission Process**

- The Admission Committee meets by the month of August and reviews the entire admission process besides analyzing the quality of intake.
- A report of comparative statement for the past few years is submitted to the College Governing Council and College Development Council.
- The committee again meets in the month of February to decide on the process for the year ahead.
- Appropriate interventional measures suggested by College Development Council are taken to further improve the quality of admission.
- The maximum percentage of marks for admission of the students has increased in the past few years.

**Comparison of maximum percentage of marks at entry level**

<b>DEPARTMENT</b>	<b>MAX. MARKS % 2012</b>	<b>MAX. MARKS % 2013</b>	<b>MAX. MARKS % 2014</b>	<b>MAX. MARKS % 2015</b>
B.E. Mechanical Engineering	97.2	96.8	97.6	98.5
B.E. Aeronautical Engineering	98.8	97.3	97.0	96.0
B.E. Automobile Engineering	95.8	93.3	94.8	96.7
B.E. Biomedical Engineering	96.4	95.6	97.5	97.2
B.Tech. Biotechnology	98.3	96.2	97.6	97.8
B.E. Computer science and Engineering	97.3	96.4	96.4	97.8
B.E. Electronics and Communication Engineering	98.3	99.4	96.9	97.8
B.E. Electrical and Electronics Engineering	96.0	95.8	96.7	97.0
B.Tech. Information technology	95.3	95.0	96.3	96.3
B.E. Civil Engineering	94.8	96.5	96.4	95.7
B.E. Mechatronics Engineering	-	-	-	95.5

Because of the sustained efforts of the institution to improve quality, the maximum percentage of the students at entry level is more than 95% in majority of cases. This is an indicator that the institution continues to attract meritorious students.

**2.1.5 Reflecting on the strategies adopted to increase/improve access for following categories of students, enumerate on how the admission policy of the institution and its student profiles demonstrate/reflect the National commitment to diversity and inclusion**

- SC/ST ● OBC ● Women ● Differently-abled ● Economically weaker sections
- Minority community
- The institution is a minority institution.
- All scholarships are made available to SC/ST/OBC/Women/First generation graduates

- Meritorious and economically weaker sections of students get institutional fellowships.
- Differently-abled students are provided all possible help.  
(More details are available in 5.1.2 & 5.1.3)

**2.1.6 Provide the following details for various programmes offered by the institution during the last four years and comment on the trends. i.e reasons for increase / decrease and actions initiated for improvement.**

Not applicable. Since admissions are made through the Single Window Admission system of the affiliating University through counseling.

Sanctioned strength of students has increased 1200 in the year 2012 To 1620 in the year 2015, which shows the growth of the institution over the years.

## **2.2 Catering to Diverse Needs**

**2.2.1 How does the institution cater to the needs of differently-abled students and ensure adherence to government policies in this regard?**

The institution caters to the needs of differently-abled students by providing them

- Elevator facility
- Wheel chairs
- Medical help
- Classrooms in ground floor
- Examination halls in ground floor
- Well -laid roads within the campus
- Help in the library and canteen
- Understanding and supportive staff members
- Ramp in all the buildings

**2.2.2 Does the institution assess the students' needs in terms of knowledge and skills before the commencement of the programme? If yes, give details on the process.**

Yes. The institution assesses the students' needs in terms of knowledge and skills before the commencement of the program by the following:

### **Induction Day:**

- The institution organizes fresher's induction day in which the respective Heads of the Department and teachers interact with the students and assess their knowledge and interests.

### **Bridge Courses:**

- The Bridge Courses conducted for the enrolled students before the commencement of regular first year teaching programme also help to assess the students.
- Special coaching classes are conducted for lateral entry students on communication skills and mathematics.

**Counseling Books:**

- Immediately after commencement of the programme, students' needs are assessed through a counseling process (by the class counselor) in terms of their performance in school, family background, skills sets in co-curricular and extracurricular activities and recorded in the counseling books.

**Details of Bridge courses/Programs conducted for current first year UG students**  
**For example, Timetable for CSE Students**

CSE – A

06.08.2015 to 19.08.2015

Hall No. AS 302

Day / Time	1	10.00 – 10.30	2	12.15 – 1.00	3
	8.15 – 10.00		10.30 – 12.15		1.00 – 3.00
MONDAY	Maths	B	Physics	L	English
TUESDAY	Physics	R	Maths	U	English
WEDNESDAY	Maths	E	English	N	Physics
THURSDAY	Physics	A	English	C	Maths
FRIDAY	Maths	K	Physics	H	English

1. Mathematics - Mrs. S. Vasanthi
2. Physics - Dr. R. Arunbalaji
3. English - Mrs. Latha Viswanath

**Schedule for additional class for first year B.E. / B.Tech. courses from 08-07-2015 to 13-07-2015 between 3.00 PM and 4.00 PM (2015-16 Odd Semester)**

S. N O	CLASS	WEDNESDAY (08-07-2015)	THURSDAY (09-07-2015)	FRIDAY (10-07-2015)	MONDAY (13-07-2015)
1	Section - A	English (Mr. Hastin fernandez)	Chemistry (Dr. P.Ramadevi)	Physics (Mr. R.Kavitha)	Physics (Mr. R.Bhavani )
2	Section - B	English (Mr. Sri hari)	Chemistry (Mrs. R.Manonmani)	Physics (Mr. M.Sankar Kumar)	English (Mrs. Latha viswanath)
3	Section - C	English (Mrs. G.Alamelu)	Chemistry (Mrs. S.Anu)	Physics (Mr. J.Vaishnavi)	English (Dr. B.Lakshmi)
4	Section - D	English (Ms.B.Lakshmi)	Chemistry (Mrs. S.Lokina)	Physics ( Mrs. Rubarani P.Gangadaran)	Chemistry (Mrs. S.Lokina)
5	Section - E	Physics (Mr. Anandaraj)	English (Mrs. N.Hema)	Chemistry (Mr. V.Vasumathi)	English (Mr. Hastin fernandez)

6	Section - F	Physics ( Mr. K.Senthil Kumar)	English (Mr. M.Vijay)	Chemistry (Mrs. S.Jasmin Francis)	Chemistry (Mr. V.Vasumathi)
7	Section - G	Physics (Mr. K.Vijayanarasimhan)	English (Mr. Salam barun singh )	Chemistry (Mrs.S.Janaki)	English (Mr. Andria Babu)
8	Section - H	Physics (Mr. M.Infant Shyamkumar)	English (Ms. Abishekha)	Chemistry (Mr. V.Inbaraj)	Chemistry (Mr. S.Mohan)
9	Section - I	Chemistry (Mr.S.Mohandoss )	Physics (Dr. R.Arunbalaji)	English (Mr. (D.R.Ganeshmurthi i )	Chemistry (Mr. V.Inbaraj)
10	Section - J	Chemistry (Ms .K.Seethalakshmi)	Physics (Mr. G.Anumantha Kannan)	English (Mrs. Latha viswanath)	English (Mr. G.Janet)
11	Section - K	Chemistry (Mr. K.Suresh babu)	Physics ( Mrs. B.Latha )	English (Mr. G.Janet)	English (Mrs. N.Hema)
12	Section - L	Chemistry (Mr. S.Mohan)	Physics (Mr. R.Bhavani )	English (Ms.M. Andria Babu)	Physics (Dr. R.Arunbalaji)
13	Section - M	English (Ms. M.Abishekha)	Physics (Mr. Anandaraj)	Chemistry (Mr. S.Mohan)	Chemistry (Mrs. S.Jasmin Francis)

**2.2.3 What are the strategies drawn and deployed by the institution to bridge the knowledge gap of the enrolled students to enable them to cope with the programme of their choice? (Bridge/Remedial/Add-on/Enrichment Courses, etc.)**

The college offers Bridge Courses in selected subjects such as Computer Programming, Engineering Graphics, Mathematics, Basic Biology etc. Language Proficiency Programmes, Computer Orientation Programmes and personality development programmes are also offered for educationally disadvantaged students and lateral entry students. Apart from Bridge courses and special classes, other remedial measures taken for the students are

- Supplementing the class notes with additional (Revision) study material.
- Discussion of University questions and answers
- Additional tests of short duration
- Counseling for students
- Remedial classes for students
- Guest lectures, Industrial Visits and training

#### 2.2.4 How does the college sensitize its staff and students on issues of gender, Environment etc.?

The college sensitizes its staff and students on issues of gender

- By providing equal opportunities for both male and female faculty members
- By making available employment initiatives, training programmes and every other facility for both boys and girls
- By organizing discourses by members of Chinmayananda Mission, Ramakrishna Mission etc.
- By offering help through professional counselors
- By creating a conducive environment catering to the diverse needs
- By giving lectures on issues of gender and psychological counseling

#### 2.2.5 How does the institution identify and respond to special educational/learning needs of advanced learners?

- Advanced learners are identified right from the beginning, from their score in the higher secondary, unit tests, model exam and first semester university examination performance. They are called and their special interests and requirements are heard and all the help is rendered to sustain their enthusiasm and further improvement in performance.
- 15-20 students are allotted to a mentor who takes care of academic and other activities through out their degree programme .
- The special educational needs are identified by the student counselors, who constantly interact and monitor students' progress.
- The institution encourages the enthusiastic students who wish to participate in various competitions conducted both inside and outside the college.
- Design Contests are conducted during every semester and evaluated by industrial experts. Winners are awarded prizes during the College Day function.
- The college organizes various competitions such as technical symposium, entrepreneurship development programs, innovative project competitions, poster presentations and quiz competitions in which they actively participate.
- The winners in the technical competitions conducted by other institutions are appreciated and given proportionate prize money. The top rank students are motivated and provided with membership in professional societies.
- Special permission is also granted for the students to take up training in reputed institutions in India and abroad for longer durations.

**Few examples are given below:**

<b>Name of Student</b>	<b>Batch</b>	<b>Type of Training</b>	<b>Prizes /Awards</b>
Shravanthi Krishna	2012-16	International	Hargobind Khorana Indo – US Research Fellowship for scholars 2015
K.Sriram	2012-16	National - Voice for BT-2015 Inter Collegiate Public speaking contest on Biotechnology organized by Novozymes South Asia Pvt Ltd Bangalore	Summer Fellowship 2015 offered by the Indian Academy of Sciences, Bangalore.
K.Sriram	2012-16	National –Voice for BT - 2015	Internship at Novozymes
Sanjeevi L.R.	2011-15	National	ICTACT Student Innovator Award 2014
D.Harinee	2009-13	National- Voice for BT-2013 Inter Collegiate Public speaking contest on Biotechnology organized by Novozymes South Asia Pvt Ltd Bangalore	1 <sup>st</sup> prize -Rs 25,000 Internship at Novozymes
T.Revathe	2010-14	National Level Students Summit on green technologies and sustainability-paper presentation	1 <sup>st</sup> prize
P.Priyadarshini	2010-14	National Level Students Summit on green technologies and sustainability-poster presentation	1 <sup>st</sup> prize
R.Shantinee	2011-15	National level- Sarang British Parliamentary Debate, IIT Madras	Best Adjudicator Award Rs.8000
N.Nandhini	2010-14	National Student Brand Ambassador for WIPRO	-
NandhiniGiri	2009-13	International-Fujiocup Quiz on stem cells and Regenrative Medicine	2 <sup>nd</sup> prize Cash Award of Rs.10,000

- The students are given grants for attending national and international level conferences.
- Value added programmes in thrust areas such as embedded systems, networking, programming in Java, PLC, robotics are conducted to cater to the needs of the advanced learners.

- They are also given extra library cards and books.
- Advanced learners in the third and fourth year are also encouraged to take competitive examinations like GRE, GATE, IES etc. and given suitable extra coaching.
- Cash prizes and certificates are awarded during College Day function to the university toppers.
- STEM cell functioning in the college gives practical hands on training to the students in handling various electrical and electronics engineering gadgets.

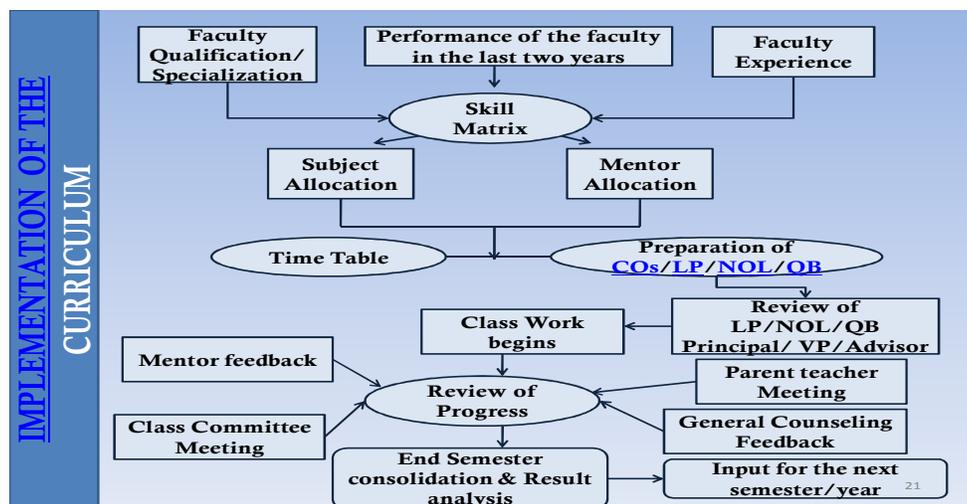
### **2.2.6 How does the institute collect, analyze and use the data and information on the academic performance (through the programme duration) of the students at the risk of drop out (students from the disadvantaged sections of society, physically challenged, slow learners, economically weaker sections etc.)?**

- Softwares like CAMS and SUPER are available to analyze the attendance and academic performance of the students.
- Result analysis is done after each and every test. Those students who are not able to perform well are given counseling and additional training through special coaching classes, wherein the class strength is kept small so that individual attention could be given.
- Slow learners and poor performers are identified in the beginning of the semester itself and they are called, counseled and given adequate guidance and hence drop outs are almost nil. Classes are conducted on Saturdays and during 3 pm – 5 pm on week days for slow learners.
- Retest is also conducted for those who have secured less mark. Crash courses are conducted at the end of the semester for all subjects.
- Economically weak students, students from vernacular medium and students with single parent are identified and scholarships are provided through staff endowment fund, special coaching given and counseling offered.
- Free books and hostel facility are provided. Fee waiver is given for meritorious students.
- Free training in software tools and also training to improve their employability are also offered.
- Individual counseling is offered in three different modes, viz., in a General counseling session by a faculty member from another department; in department counseling session by the same department faculty member and also by a Professional Counselor if needed.

## **2.3 Teaching-Learning Process**

### **2.3.1 How does the college plan and organize the teaching, learning and evaluation schedules? (Academic calendar, teaching plan, evaluation blue print, etc.)**

- All the academic activities such as commencement of the classes for the students of various semesters, based on the date of completion of the previous semester University examinations, duration of unit tests and class committee meetings etc., are pre-planned meticulously for the academic year and a hard copy of the calendar is given to all the students and faculty, on the first day of the academic year (ref. 1.1.2). The class time table is also prepared well before the commencement of classes and so a detailed lesson plan is prepared by each faculty and informed to the students.
- Lesson plan, notes on lesson and lab manuals prepared meticulously are posted in the website.
- The class room learning and laboratory practice continue as per the plan and tests are conducted as per the announced schedule. After each test, the students' performance is analysed using a software developed for this purpose and an assessment is made for each subject. Then a class committee meeting is held for each class including student representatives. The performance is discussed, students' requirements are heard and steps are initiated to overcome the inadequacies if any in the teaching-learning process. Suitable special classes are planned for the students with inadequate performance.
- The mark sheet for every test is communicated to the parents through SMS so that they can come with their feedback, for the subsequent Parent-Teachers meeting.
- The proposed dates for the College Day, Graduation Day, Sports Day, Cultural Day and holidays are also printed in the academic calendar so that concerned committees can plan their activities accordingly well in advance.
- The calendar also carries important information about the institution like, its Vision, Mission, Emblem, College Governing Council members, details regarding library, hostels and transport facilities. Rules and Regulations to be observed in the college and hostel.
- Webinar series of lectures (online portal classes for certain subjects wherein the classroom lectures need to be supplemented with additional examples, explanation and numerical examples) are conducted.
- e-learning system such as MOODLE is utilized to make the teaching- learning process more interactive with provision for taking on-line tests.
- IQAC performs auditing of the documents of all departments twice a semester.



### 2.3.2 How does IQAC contribute to improve the teaching –learning process?

- The Internal Quality Assurance Cell plays a pivotal role in the quality assurance in the teaching-learning process.
- The IQAC helps in framing an action plan for the academic year by interacting with management, faculty, administration, laboratory staff and students.
- The IQAC organizes regular academic audits to ensure effective implementation of teaching learning process and maintenance of course files. For the academic year 2014-15, the details are given in the table

S. No	Auditors	Department of Reviewers	Audit Date
1.	1. Ms.Padmavathy 2. Ms.Jayashree	Department of Electrical and Electronics Engineering	23.3.15
2.	1. Ms.P.Revathy 2.Ms.E.Surya	Department of Computer Science and Engineering	23.02.15
3.	1. Mr.Girishankar 2.Mr.Parthiban	Department of Mechanical Engineering	20.11.14
4.	1. Ms.P.Revathy 2.Ms.E.Surya	Department of Computer Science and Engineering	01.08.14

- The IQAC interacts with the class teachers in the timely conduct of class committee meetings and also in the implementation of the follow up steps envisaged to improve the teaching-learning process.
- It gets an overall feedback from the departments on the performance of the students in the unit tests and retests and coordinates the arrangement of special classes outside the working hours wherever necessary.
- The cell coordinator takes part in the discussion on the analysis of performance in the university semester examinations for all the classes and the remedial measures are taken to improve the results in subjects wherever there is a decline.
- The IQAC helps the HoDs in organizing FDPs for the faculty to help them learn the current trends in their specializations and facilitate them to handle the concerned subjects with better preparation and confidence.
- The cell also initiates workshops for the technical supporting staff who are involved in assisting the laboratory sessions with a view to enhance their practical skills with which they can help the fabrication and testing part of students' project models.
- Based on the feedback, a report is generated by the IQAC to bring transparency / objectivity /accountability in the teaching learning process.

### 2.3.3 How is learning made more student-centric? Give details on the support structures and systems available for teachers to develop skills like interactive learning, collaborative learning and independent learning among the students?

Learning is made more student centric by

- Interactive learning through regular classes supported with seminars, quiz, role play, debates, brain storming sessions etc
- Collaborative learning is supported by industrial and in-house projects.
- Independent learning is encouraged through assignments and seminars.
- A period is set apart as a seminar session in the Time table itself for which the students come prepared and deliver a lecture in the class on a pre-assigned topic. The teacher present in the class asks questions to assess the grasp of the concepts and applications by all the students and initiates a discussion on the topic which provides opportunities for collaborative learning.
- In the tutorial class allotted for certain problem oriented subjects, more than one teacher will be present in the class and they act as facilitators for the students in working out the solutions and the students also form small groups and discuss among themselves which promote interactive and peer learning.

#### **2.3.4 How does the institution nurture critical thinking, creativity and scientific temper among the students to transform them into life-long learners and innovators?**

- Continuous efforts are made by the faculty to nurture critical thinking among the students through various strategies.
- In addition to lecture method, ICT tools are used to make space for experiential learning among the students.
- Project works are suitably integrated into the curriculum and the faculty encourage Peer Group work, group assignments and Group discussion for promoting qualitative learning process.
- Socially relevant Mini and Final Year projects involving fabrication and testing are encouraged among students. Best projects after evaluation are submitted for patenting.
- The institution nurtures creative thinking through programmes organized by WIPRO technologies during the first semester. Our college is a Mission 10X Technology learning center.
- The innovative project cell functioning in the campus for the past 13 years, has been recently named as **A.P.J. Abdul Kalam Innovative Project Cell**, after our beloved former President and renowned scientist. This project cell has been functioning to kindle the R & D interests of the young students. Winners of Innovative project cell contests are offered incentives & certificate of appreciation.
- Interactive instructional techniques are adopted through focused group discussions, debates and presentations.
- In the laboratory classes, students are also provided with facilities to carry out certain experiments beyond the curriculum and make their own observations so that they imbibe a scientific temper.
- The College subscribes to 2235 International and 347 National Journals to provide access to the students to the best ideas available in specific areas of knowledge. Knowledge creation is facilitated through exposure to knowledge available globally

and students are encouraged to access all the facilities in the library including on-line journals through IEEE, ASME and ASCE.

- Students are also motivated to go for summer training, internship (or in-plant) at leading industries and research institutes. Design Contests are conducted as an intra departmental activity and evaluated by company experts.
- IIT Alumni are invited for guest lectures and thereby nurturing learning as a continuous process through PALS lecture series organized by IITM, Chennai.

**2.3.5 What are the technologies and facilities available and used by the faculty for effective teaching? E.g. Virtual laboratories, e-learning – resources from National Programme on Technology Enhanced Learning (NPTEL) and National Mission on Education through Information communication and Technology (NME-ICT), open educational resources, mobile education, etc.**

- REC is an approved remote centre of FDPs conducted by IIT Kharagpur, NMEICT, MHRD and IIT Bombay.

S.No	Title	Sponsoring Institute	Duration	No.of.Participants
1	Two Weeks ISTE Main Workshop on "Design of Algorithms"	IIT Karagpur	25-May-15 To 30-May-15	30
2	Two Weeks ISTE Main Workshop on "Control Systems"	IIT Karagpur	15-Sep-14 To 19-Sep-14	25
3	Workshop on Control systems	IIT Karagpur	02.12.2014 to 12.12.2014	10
4	Two Weeks ISTE Main Workshop on "Cyber Security"	IIT Bombay	10-Jul-14 To 20-Jul-14	30
5	Two Weeks ISTE Main Workshop on "Computer Networking"	IIT Bombay	30-Jun-14 To 5-Jul-14	12
6	Two Weeks ISTE Workshop on "Computer Programming"	IIT Bombay	16-Jun-14 To 21-Jun-14	29
7	Two Weeks ISTE Main Workshop on "Fluid Mechanics"	IIT Karagpur	20-May-14 To 30-May-14	24
8	Workshop on Signals and systems	IIT Karagpur	02.01.2014 – 12.01.2014	25

- The college has conducted FDPs under Ekalaiiva e-outreach programme sponsored by IIT Bombay. More than Twenty such programs were hosted at REC so far.
- REC is also an approved study centre for NPTEL  
The institution also makes use of working models, charts and demonstration experiments and role play to make the teaching effective and interesting.
- 48 LCD projectors are available in various departments and seminar halls.

- Faculty members prepared well laid out PPTs on various topics with the guidance of senior faculty
- Moodle software is used by the faculty to communicate to the students regarding the class schedules, session plans, assignments, quizzes etc.,
- Webinar lectures are delivered by experts with long years of experience
- Internet resources, Virtual laboratories and Open source softwares are available
- Nodal Center (for IITs, CSI)
- Faculty members provided with individual systems with internet access to learn from e-learning resources like NPTEL, NME-ICT, etc.

**Heritage Center named after Sir CV Raman** has also been established, housing a museum wherein models and posters depicting the course of development in various fields of engineering and technology and also a seminar hall to project videos of such innovations and advancements.

**Inauguration of the Heritage Centre by Dr. A. Sivathanu pillai**



**2.3.6 How are the students and faculty exposed to advanced knowledge and skills (blended learning, expert lectures, seminars, workshops etc.)?**

- Advanced knowledge imparted to the students through value added programmes on current developments in the respective fields and guest lectures by industrial experts.
- For example the Department of EEE conducted following guest lectures as part of their value added programmes in 2014-15.

S.No	Date	Name and Address	Title	Target Audience
1	25.7.14	Mr.Anup Mohan,Senior design Engineer,Larsen & Toubro Ltd, Chennai	Concept of Substation Design	III EEE
2	1.09.14	Mr.V.Chandrasekar,Chief Engineer,TVS LUCAS Pvt.Ltd, Chennai	Electrical Engineering: scope and career prospects	II EEE
3	1.09.14	Mr.N.Dhinakaran,Senior Engineer,ABB GISL Limited,	Power System protection	IV EEE

- For example the Department of Mechanical Engineering conducted following workshops and seminars as part of their value added programmes in 2014-15.

S.No	Name of the Programme / Topic	Sponsored by	Date
1	KRIDAYANTHRIK 14	REC	05-09-2014
2	IIIE (Student Chapter Inauguration)	REC	09/10/2014
3	IIW Welding Technology	REC	11/10/2014
4	INGENIOUS 2015	REC	28-02-2015

- Students guided in organizing technical seminars on advanced topics and encouraged to refer articles published in reputed journals and prepare papers and present them in seminars conducted by other reputed institutions

**Cited below is the List of some of the Publications in Journals with good impact factor by Students and faculty from the Department of Biotechnology (Jan 2015 - Dec 2015)**

1. M. Sankar, R. Johanna, D. Sridhar, “Effect of Hepatoplus on isoniazid and Rifampicin induced Hepatotoxicity in liver cell lines” Int. J. Pharm. Pharm. Sci., vol.7, pp. 215-219. January 2015. ISSN No. 0975 – 1491. (Impact Factor 1.59)
2. T. Anitha, P. S. Kumar, K. S. Kumar, “Binding of Zn(II) ions to chitosan –PVA blend in aqueous environment: Adsorption kinetics and equilibrium studies,” Environ. Prog. Sustain. Energy., vol.34, pp. 15-22. January 2015. ISSN No. 1944-7450. (Impact Factor: 1.403)
3. R. Anila , S. Sathiya, C. S. Babu, R. Johanna, “ In vitro and in vivo protective effects of Ambrex, a polyherbal formulation, against methotrexate induced damages in hepatic cells,” Int. J. Pharm. Pharm. Sci., vol.7, pp. 164-170. June 2015. ISSN No. 0975-1491. (Impact Factor: 1.59).
4. T. Anitha, P. S. Kumar, K. S. Kumar, K. Sriram, J. F. Ahmed, “Biosorption of lead (II) ions onto nano-sized chitosan particle blended polyvinyl alcohol (PVA): Adsorption isotherms, kinetics and equilibrium studies”, Desal. Water Treat., (Accepted June 2015). doi: 10.1080/19443994.2015.1061951. (Impact Factor: 1.173).
5. C. Shivashri, T. Rajarajeshwari, D. Ramesh Kumar, P. Rajasekar, “Biogenesis, characterization, and the effect of vicenin-gold nanoparticles on glucose utilization in 3T3-L1 adipocytes: A bioinformatic approach to illuminate its interaction with PTP 1B and AMPK,” Biotechnol Prog., vol.31, pp. 1096-106 2015. July-August 2015. Online ISSN No. 1520-6033 (Impact Factor: 2.149).
6. S. Sabarunisha Begum, K. V. Radha, “Gas-liquid mass transfer studies in inverse fluidized bed biofilm reactor for the biodegradation of industrial effluent rich in phenolic compounds”, Environ. Prog. Sus. Energy, (Accepted September 2015) DOI: 10.1002/ep.12256. Online ISSN No. 1944-7450. (Impact Factor: 1.403)
7. R. Rekha, S. Nitika, R. Sujata, A. R, Thakur, G. Subhadra, K. Sriram, A. Jamuna Devi, R. Johanna, “Interaction Studies of Withania somnifera’s Key Metabolite

- Withaferin A With Different Receptors Associated with Cardiovascular Disease,” Curr. Comput. Aided Drug Des., vol.11, pp. 212-221. 2015. ISSN No. 1875-6697 (Online), ISSN No. 1573-4099 (Print). (Impact factor 1.268).
8. T. Anitha, P. S. Kumar, K. S. Kumar, S. Ramalingam, “Adsorptive removal of Pb (II) ions from polluted water by newly synthesized chitosan polyacrylonitrile blend: Equilibrium, kinetic, mechanism and thermodynamic approach,” Process. Saf. Environ. Prot., vol.98, pp.187-197. November 2015. (ISSN: 0957-5820). (Impact Factor: 2.55).
- Industrial visits are arranged to expose the students on advanced machineries, equipment, processes and technology practiced in the industries.
  - Workshops are arranged for the faculty on emerging areas to enable them to learn the subjects in such areas and equip themselves for teaching students and helping them in carrying out projects of current industrial requirements
  - The faculty are supported and sponsored by the College to attend skill up-gradation programmes organized by other reputed institutions facilitated through Knowledge Management Cell. A structured online application form is maintained by this KMC cell. A total of 1374 entries have been processed in the last four years by this cell, enabling large number of teachers to participate in various skill-upgradation programmes.

### **2.3.7 Detail (process and the number of students /benefited) on the academic, personal and psycho-social support and guidance services (professional counseling/mentoring/academic advise) provided to students?**

- Academic counseling given to all students :
  - i) Regular counseling by every faculty/mentor for 15 -20 students in the department.
  - ii) General counseling – once in a semester for all the students by teachers from other departments
- Personal/referred counseling for the needy by a professional counselor
- Psycho-social support/scholarships in deserving cases
- Apart from the above, career guidance provided by the Training and Placement cell and the respective departments

Career Guidance Programmes organised during 2014-15 by the **Training and Placement Cell**

S. No	Name of The company	Date of the Program	Program Venue	Program Theme	Participated Students Strength	Target Audience
1	GATE Forum	05.08.2015	Seminar hall	GATE	350	2nd, 3rd and final yr higher education registered students
2	International Educational Fair	25.09.2015	Seminar hall	GRE, GMAT, IELTS, TOEFL	400	2nd, 3rd and final yr higher education registered students
3	Hot courses	20.08.2015	Help desk	GRE, GMAT, IELTS, TOEFL	Not Applicable	Not Applicable
4	International Knowledge center	15.09.2015	Seminar hall	GRE, GMAT, IELTS, TOEFL	400	2nd, 3rd and final yr higher education registered students
5	ELS Educations	21.09.2015	Seminar hall	GRE, GMAT, IELTS, TOEFL	400	2nd, 3rd and final yr higher education registered students
6	Princeton Review	28.09.2015	Seminar hall	GRE, GMAT, IELTS, TOEFL	400	2nd, 3rd and final yr higher education registered students

**2.3.8 Provide details of innovative teaching approaches/methods adopted by the faculty during the last four years? What are the efforts made by the institution to encourage the faculty to adopt new and innovative approaches and the impact of such innovative practices on student learning?**

- In order to impart more innovative approaches in the teaching-learning process, the institution motivates all the faculty members to attend FDPs and Training programs, National and International Seminars, Conferences/Workshops organized by reputed institutions, Anna University and IITs. For PG courses like MBA, pedagogy includes field projects, management games, role plays and case studies.
- The institution organizes Wipro Mission 10X, transactional analysis workshop for the faculty to improve their teaching methodologies. Training programs are conducted for the faculty members, who in turn train the students in developing projects using UTLP toolkits in the area of embedded technology and Bosch training in the area of automobile.

- Faculty members are encouraged to attend industrial training programmes on sabbatical leave for a period of 1-2 weeks in a semester.
- NPTEL, Simulations, Virtual Labs, PPTs and Charts are extensively used to augment conventional black board teaching. Working prototype models are also shown in the class rooms. Role plays, simulation studies, field visits, surveys and demonstrations are also incorporated in teaching methodology.
- Workshops are conducted for faculty members on NPTEL video lecture editing.
- In the laboratory oriented courses, students are given the freedom to conduct certain experiments, to strengthen the theoretical concepts they are taught in the class room, under the supervision and guidance of the laboratory instructor.
- Variety of software tools, systems with internet down loading facility are made available to the entire faculty to enable them to teach certain topics through extensive simulation techniques.
- The institution encourages the faculty in adopting new methods of e-learning such as Moodles (website organized by institution) in which a student can visualize the concepts sitting before the computer and downloading the day-by-day session- wise topics being taught in classroom.
- Apart from classroom interactions, the students undergo in-plant training, visit industries, present papers, carry out in-house projects, and take up paper publication etc., and faculty give them guidance in all such activities so that the class room learning is effectively and innovatively supplemented.
- **Sir C.V. Raman Heritage Centre** has been established for exhibiting, charts and models. This centre is also being utilized by the departments for videos in an adjoining hall.
- The institution has been identified as a Remote Center for various e-outreach IIT programs. Teachers enroll in such programs and get benefited.
- Various online programs like Massive Open Online Courses have been utilized by faculty members of all departments.

### 2.3.9 How are library resources used to augment the teaching-learning process?

- The College has a well equipped central library with necessary text and reference books, periodicals, journals and e-resources in all the subjects related to engineering, technology, management, science and humanities.

Library holdings	2012-13	2013-14	2014-15	2015-16 (till date)
	Numbers			
Text books	2915	3056	3312	1081
Reference Books	94	93	141	76
Journals/ Periodicals	5981	6014	6363	4403
e-resources	5759	5772	6100	4315

- Students with 8.5 CGPA and above are given additional library cards.
- Audio Visual lab of library is utilized by the students for video lectures (NPTEL) and there is also a separate space for research scholars.
- Apart from the central library, every department has a separate library with adequate collection of text and reference books and journals. Refer 4.4.2

**2.3.10. Does the institution face any challenges in completing the curriculum within the planned time frame and calendar? If 'yes', elaborate on the challenges encountered and the institutional approaches to overcome these**

Yes.

IQAC members in the respective department discuss with the faculty members periodically and assess the completion of curriculum as per the lesson plan prepared in the beginning of the semester. This information is taken to the HODs meeting to plan suitable additional hours/days for completing the syllabus and train the students and prepare them to take up the end-semester exams. Areas of challenges particularly addressed by the IQAC members are the following:

- For certain problem oriented subjects where the students need more examples to be worked out.
- Additional hours in the regular time table than prescribed by the university to complete the syllabus in certain subjects needing more time to be spent on basics and pre-requisites.
- Adequate tutorial classes for design oriented subjects.
- Special classes necessitated for slow learners and lateral entry students to make them gain the required confidence in the system.

**2.3.11 How does the institute monitor and evaluate the quality of teaching learning?**

The institution regularly and systematically evaluates and monitors the quality of teaching in the following ways:

IQAC initiates the internal auditing of the following activities of the department.

- Preparation of result analysis at the end of each unit tests and class tests systematically and taking them to class committee meeting.
- Conduct of class committee meetings to discuss the effectiveness of the teaching-learning process and the student's performance.
- Gathering of online feedback from the students after one month from the commencement of the semester.
- Measuring the output through involvement in innovative and constructive projects.
- The academic audit by organizations like TUV-NORD every year for strengthening the evaluation process.
- Compilation of 20 point feedback from the students at the end of the semester on every course taught in that semester.
- Collection of exit feedback is collected from the final year students.
- Arranging self appraisal sessions for all the teachers based on many criteria such as results produced and innovative teaching methods adapted etc.

Again the outcomes of these points are taken to the HODs meeting wherein the remedial measures wherever needed, including the training needed for teachers to improve the subject knowledge and quality of teaching are discussed and finalised.

## 2.4 Teacher Quality

### 2.4.1 Provide the following details and elaborate on the strategies adopted by the college in planning and management (recruitment and retention) of its human resource (qualified and competent teachers) to meet the changing requirements of the curriculum

- The recruitment is based on merit in terms of qualification, experience and attitude. The applications received are scrutinized by the Deans and HoDs and short-listed. The short-listed candidates are called for an interview. A selection committee comprises of the Chairperson of the institution, the Principal, concerned HoD and external experts.
- Retention is enabled through conducive HR policies such as sixth pay, other allowances, appraisal based increments and promotions.
- Travel and registration fee to attend the conferences, sabbatical leave for Ph.D. and PDF, loan and PF facility, maternity leave, motivation and encouragement to professional advancement also facilitate the retention of teachers with the institution.
- Teacher –student ratio of about 1: 15 is maintained as per Anna University and AICTE norms.

**Teacher Quality for the academic year (2015-2016)**

Highest qualification	Professor		Associate professor		Assistant professor		Total
	Male	Female	Male	Female	Male	Female	
<b>Permanent teachers</b>	<b>31</b>	<b>15</b>	<b>33</b>	<b>30</b>	<b>129</b>	<b>170</b>	<b>408</b>
D.Sc./D.Litt	-	-	-	-	-	-	-
Ph.D.	28	15	11	5	2	11	72
M.Phil.	-	-	2	7	22	39	70
PG	3	-	20	18	105	120	266
<b>Temporary teachers</b>	NIL						

**2.4.2 How does the institution cope with the growing demands and scarcity of qualified senior faculty to teach new programmes/ modern areas of study being introduced (such as Biotechnology, IT, Bioinformatics etc.)? Provide details on the efforts made by the institution in this direction and its outcome during the last three years.**

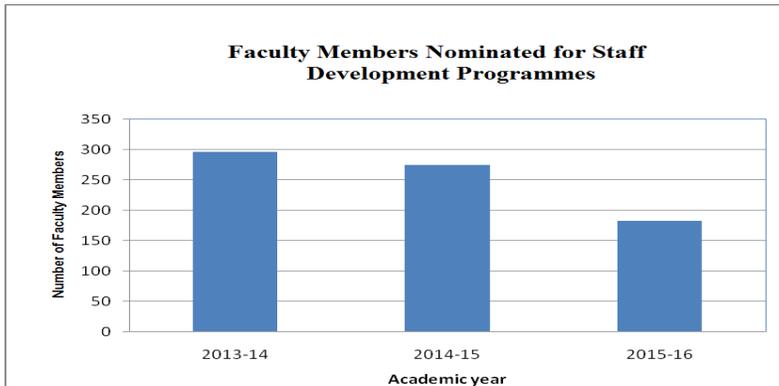
- The college encourages teachers to participate in orientation and refresher courses, workshops, seminars at state, national and international levels to learn and teach particularly new programs in emerging areas.
- Management supports teachers who take up higher studies and improve their qualification.
- Senior faculty members are recruited who are at the level of mentoring junior faculty in subject preparation and teaching methodologies.
- Necessary books and journals in thrust areas are identified, procured and made available in the library on request from the teachers.
- Training programs on usage of IT related softwares are organized.
- Adjunct faculty members are invited to give guest lectures on specific topics.
- Out of the 408 teachers, 72 are doctorates and 116 are pursuing PhD both in REC Research centers as well as other institutions.

**2.4.3 Provide details on staff development programmes during the last four years. Elaborate the strategies adopted by the institution in enhancing the teacher quality.**

**a. Nomination to staff development programmes**

To improve the competency of the teachers, the institution organizes need based workshops in the institution and also motivates them to attend refresher courses,

orientation programs, workshops, seminars etc., conducted by other institutions. The affiliating university also organizes staff training programmes which help in enhancing the quality of the teachers.



- b. **Faculty Training programs are organized by the institution to empower and enable the use of various tools and technologies for improved teaching-learning**

**Number of programs organized by the various departments in the last two years is as follows:**

SI No	Engineering/Technology Departments	Staff Development Programs Organized
1	Aeronautical	9
2	Automobile	4
3	Biomedical	13
4	Biotechnology	4
5	Civil	2
6	Computer Science	19
7	Electronics & Communication	8
8	Electrical & Electronics	7
9	Information Technology	41
10	Mechanical	15
11	Management (MBA)	5
12	Computer Applications (MCA)	9
13	Science & Humanities	2

- **Teaching learning methods/approaches:** Organizing Wipro Mission 10X, transactional analysis training program, faculty induction for fresh teachers, programs by IBM etc. and facility for sabbatical for the faculty members during vacation
- **Handling new curriculum :** Mentor system and Faculty Preparation Programs  
Anna University sponsored FDPs are conducted during summer and winter vacations in subjects wherever modifications are made in the curriculum. For example, the Department of Mechanical Engineering the following FDPs have been conducted in 2014

S.No	Name of the Programme /Topic	Sponsored by	Duration	
			From	To
1	FDP on “Engineering materials and Metallurgy”	Anna University	03-01-2014	10-01-2014
2	FDP on Design of machine elements	Anna University	11/06/2014	18/06/2014
3	SDP on “ Kinematics of Machinery”	Anna University & REC	09/12/2014	16/12/2014

- **Content/knowledge management:** Seed money, On Duty permission, travel grants, registration fee and permission and support to attend seminars, conferences etc through Knowledge Management Cell and appreciation for book/journal publications. The course material is deposited with KMC for ready reference for other teachers.
- **Selection, development and use of enrichment materials/Teaching learning material development, selection and use:** Provision of Softwares like Moodles to post lesson plan, notes on lesson, question bank, university questions and answers, lab manuals, books, assignments
- **Assessment** –Assessment by the mentor, Head of the Department and Principal and also through feedback from the students
- **Audio Visual Aids/multimedia** –Training programs for using latest technologies and provision of conference halls and seminar halls with multimedia and audio visual teaching aids
- **Cross cutting issues** : organizing lectures on gender issues, environmental awareness, alternative fuels and other socially relevant issues

#### c. Percentage of faculty

- invited as resource persons in Workshops / Seminars / Conferences organized by external professional agencies  $\approx 10\%$
- participated in external Workshops / Seminars / Conferences recognized by national/international professional bodies  $\approx 60\%$
- presented papers in Workshops / Seminars / Conferences conducted or recognized by professional agencies  $\approx 40\%$

#### 2.4.4 What policies/systems are in place to recharge teachers? (e.g. providing research grants, study leave, support for research and academic publications teaching experience in other national institutions and specialized programmes)

- The institution strongly believes in continuous learning and qualitative improvement in all the domains of the campus life.
- Teaching faculty are continuously encouraged and motivated to pursue higher studies and re-charge for better performance on the professional side.

- The management promotes teacher development by motivating them to go for higher studies (Ph.D./ PDF) and providing study leave, sponsorship and flexibility in working hours.
- Teachers are sponsored to attend and present papers in international conferences / seminars, training programmes, faculty development programmes conducted by the university and other agencies.
- Every department conducts Faculty Development Programs on a periodic basis. Further, interactive programs and Workshops are organized to make teachers abreast of the latest developments in domain areas.
- Research project grants are given by the management and necessary steps are taken to patent their innovative ideas and products.
- Research activities and sponsored projects are encouraged and every year large number of proposals are prepared and sent to AICTE and other agencies for funding.
- There are MoUs for academic development with renowned institutions and industries.

The innovative programs periodically conducted for the students in the campus are in the areas of Electrical and Electronics circuit building and testing (STEM), Automobile related training (BOSCH), Embedded system based designs (Thinks Lab, UTLP sponsored by IIT Bombay and Wipro Technologies respectively), Robotics training (LEMA Labs sponsored by IIT Madras) etc.

For example the automobile related Workshop programs are as follows:

Year	Events	Date(s)
2015-16	Advances in fuel handling systems in SI Engines: from carburetor to Fuel Injection	21.08.15 & 22.08.15
2014-15	Advanced systems in Automobile Engineering with Open ECU	03.03.15 to 06.03.15
2014-15	Advanced systems in Automobile Engineering with Open ECU	26.05.15 to 28.02.15

The total number of FDPs organized in 2014-15 is 38.

For example, for 2014-2015, details of Interaction/FDP programs organized by Department of Mechanical Engineering are given below:

S.No	Name of the Programme /Topic	Sponsored by	Duration	
			From	To
R E1 R	SDP on “ Kinematics of Machinery”	Anna University & REC	09/12/2014	16/12/2014
E C <sup>2</sup>	Recent Advances In Supply Chain Network Management	AICTE	06/04/2015	18/04/2015
3	Experiences in design with social Relevance	REC	17/06/2015	-

REC is also a Nodal center for IITs and CSI for conducting Webinar programmes:

Department	Institution	Programme held in
CSE	IIT-Kharagpur	2013-14
CSE	CSI	2013-14
EEE	IIT- Kharagpur	2014-15

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- 2.4.5. Give the number of faculty who received awards / recognition at the state, national and international level for excellence in teaching during the last four years. Enunciate how the institutional culture and environment contributed to such performance/achievement of the faculty

Details of awards won by faculty/department in the area of teaching and connected research in the last four years:

S.No	Award	Department/Awardee	Year
1.	ISTE Best Teacher Award	Auto/Dr.S.Sampath	2011
2.	Albert Einstein Award	BT/Dr.S.Mohamed Ali	2011
3.	CSI Significant Contribution Award	CSE/Mr.Benedict Jayaprakash	2012
4.	Best Guide Award from KCP Endowment	Auto/Dr.V.Muthu	2012
5.	Best Teacher Award, Anna University and Ethiraj College, Chennai.	MBA/Dr.Ragothaman	2012
6.	CSI Significant Contribution Award	CSE/Mr. Bhuvaneshwaran	2013
7.	International Fellowship on Health Technology Assessment	BME/Dr.S. Mohamed Yacin	2013
8.	Active Participation Award,CSI	CSE/Ms.Priya Vijay	2013
9.	Active Participation Award,CSI	IT/Ms.Bhagavathi Priya	2013

10	Young Teacher Award, IET, Chennai Chapter	EEE/Mr.V.Venkatesh	2014
11	Received CSI – Highest sponsorship of CSI Events Award , CSI – Longest student branch counselor Award and CSI – Best accredited student branch 2014	IT/Prof.P.Kumar	2014
12	Faculty Excellence Award	IT/G.Rajesh kannan	2014
13	Faculty Excellence Award	IT/R.Chithambaramani	2014
14	Faculty Excellence Award	IT/R.Chithambaraman	2014
15	Awarded with Inspire Faculty Partnership Level 2015 (silver)	IT/Babu Rajendiran	2015
16	Awarded with Inspire Faculty Partnership Level 2015 (silver)	IT/Chithambaramani R	2015
17	Awarded with Inspire Faculty Partnership Level 2015 (silver)	IT/Raishabanu Ayubkhan	2015
18	awarded with Inspire Faculty Partnership Level 2015 (bronze)	IT/Rajesh Kannan	2015
19	OVERALL CHAMPIONSHIP for Medha Milan 2015	IT/Dr.S.Poonguzhali	2015
20	IT/Best paper award for “Applying classifier algorithm to organizational memory to build an attribution predictor model”	IT/Dr. S. Poonkuzhali & R.Kishore Kumar	2015
21	Fellowship of the World Business Institute of Australia”	MBA / Dr. K.R. Sowmya	2015
22	UGC Travel Grant Award to USA	BME / Dr. S. Mohamed Yacin	2015
23	Recognised as a Fellow in the American Society of Mechanical Engineers	MECH / Dr.Natteri M Sudarshan	2015
24	All India topper in IIT-NPTEL conducted exam	ECE / Ms. Sheena Christobel	2015
25	Outstanding Scientist Award (Engg/Civil)- Venus International Research Foundation	Civil/Dr.S.Geetha	2015

The Institution’s culture, support and motivation rendered by the Management for continued achievement by the faculty in the area of teaching and research and also the conducive academic environment prevailing in the college have helped the faculty in securing these special awards.

#### **2.4.6 Has the institution introduced evaluation of teachers by the students and external Peers? If yes, how is the evaluation used for improving the quality of the teaching-learning process?**

Yes. IQAC organises evaluation of teachers by students in the following ways.

- Students give their on-line feedback on the subject teachers, after 4 weeks from the commencement of every semester. Required remedial measures are taken based on the feedback, during the middle of the semester itself by discussing with the respective teachers.
- Class committee meetings are conducted after every series of internal tests. During these meetings, chaired by a person who doesn't handle that class for the particular section, student representatives and their subject teachers openly discuss the problems and arrive at certain plans. Feedback obtained is used for overall improvement of the teaching learning process.
- At the end of the semester a format containing 20 questions, covering all aspects, including the depth of subject preparation, clarity in the delivery of the lecture, encouraging the students to ask questions, evincing interest in the students' progress, punctuality, pace of syllabus coverage and interaction with students etc. are collected and evaluated. The average score obtained by each teacher is calculated on a 5 Point scale. The HoD and Dean study the score sheet of every teacher and wherever certain deficiencies are observed, the teacher is counseled accordingly to ensure that they improve their performance in the subsequent semester.
- Feedback is also obtained from external examiners on the student's performance in the university practical examinations and appropriate measures are taken wherever they point out that the students need more technical input.

### **2.5 Evaluation Process and Reforms**

#### **2.5.1 How does the institution ensure that the stakeholders of the institution especially students and faculty are aware of the evaluation processes?**

- On the Induction Day, the first year students are made aware of the evaluation processes.
- The university allots 80% marks for the end semester exams and 20% internal marks. The internal marks are based on the cycle test, model exams and attendance percentage. Internal marks and attendance are periodically communicated (SMS) to the parents.
- The students are made aware of the evaluation procedures including revaluation and challenge valuation, examination pattern of college and the university, well in advance through circulars as well as information printed in the college calendar.
- Attendance is entered periodically in the Anna University web portal.
- During Parent-teachers meeting, parents are made aware of accessing the students' marks from the Anna university web portal.
- Faculty members are appraised of the students' feedback by the HoD.

**2.5.2 What are the major evaluation reforms of the university that the institution has adopted and what are the reforms initiated by the institution on its own?**

**Reforms introduced by the University:**

- University has created web portal for entry of internal marks and attendance in four slots spread over the semester.
- A provision has been created by the university for entering the feedback in the university web portal on the end semester examination question paper, by respective faculty members involved in the course.
- In recent years university has developed a data bank of teachers and their subjects of specialization (Theory and Labs).
- During university paper evaluation, teachers with minimum three years of experience are called for evaluating answer scripts.
- The University has created systems through which students can opt for Photocopy of the answer script and also apply for reevaluation. In case of the contention of the student being right, the University reimburses the the fee paid for Challenge evaluation.

**Reforms introduced by the Institution:**

- The Calendar of events prepared in tandem with the University Calender also provides information on the set dates for tests, assignments, Model Exams, counseling etc, so that students can plan the course of action.
- The question paper patterns for the internal examinations have been standardized by the institution, in respect of Part A and Part B questions and Units coverage with a view to quantitatively assess the specified Course Outcomes for each course.
- The College Examination Cell holds the onus for all exam related activities and through coordinated efforts of all the stakeholders the entire evaluation system is smoothly managed. Student scores are promptly intimated to the students as well as their parents.
- Retests are conducted for students who fail to secure minimum % marks, with a special timetable framed for that purpose.
- The Unit Test marks and attendance are promptly entered in the SUPER software and internal marks and attendance entries are made in the university web portal as per the schedule.
- The institution is identified as a centre for valuation by the university.
- Faculty members are invited for setting question papers, to officiate as external as well as internal examination members by the university for various purposes.

**2.5.3 How does the institution ensure effective implementation of the evaluation reforms of the university and those initiated by the institution on its own?**

- The HoD/Senior faculty verify the pattern, quality and correctness of the question papers prepared for the unit tests and ensure that the question papers are sent to the examination cell in time, the answer papers are valued and handed over to the students within three days from the conduct of the examination and marks are entered in the SUPER software.
- The college acts as a Center for Valuation under Anna University.
- The senior faculty members are identified by the University for setting the question papers.
- The college sanctions 'On duty' permission to the teachers going for central valuation of answer papers organized by the University.
- The institution creates awareness to the students on the procedures for revaluation through circulars and class teachers.

**2.5.4 Provide details on the formative and summative evaluation approaches adopted to measure student achievement. Cite a few examples which have positively impacted the system.**

Formative evaluation is made through class tests, unit tests, and model examination, the scheduled for which is made in the beginning of the semester itself. Also the following factors are also considered:

- Achievements in technical paper/poster presentations
- Participation in innovative project cell contest 'i Quest'
- Achievements in co-curricular and extra-curricular activities such as sports, cultural activities.

Summative evaluation is based on performance in the University examinations. The following assessments are also made:

- Performance in competitive exams
- Admissions into reputed universities with fellowships
- Placement records

Offshoots:

- Effective teaching learning process has resulted in maintaining a high pass percentage and increase in number of university ranks.
- The training and performance of students during Employability Training Camps has improved the placement records.
- Participation in technical seminars has improved the knowledge and confidence in the subjects.
- Involvement in 'i Quest' competitions has promoted innovative thinking and creative ideas.
- Participation in cultural and community service activities has improved the managerial skills, leadership qualities and the overall personality among the students.

**2.5.5 Enumerate on how the institution monitors and communicates the progress and performance of students through the duration of the course/programme? Provide an analysis of the student's results/achievements (Programme/course wise for last four years) and explain the differences if any and patterns of achievement across the programmes/courses offered.**

- Students' attendance is informed to parents through SMS.
- Monthly twice, attendance of the students is monitored and an undertaking is obtained from the students having shortage of attendance in that period.
- After every unit test, reports and attendance are sent to the parents via SMS and Mail.
- Result analysis graphs are arrived at to analyze the every unit test performance.
- The progress of the ward is discussed in the parent-teacher meetings.

Result Analysis for UG course in the last four years												
Dept	Year of Graduation											
	2012			2013			2014			2015		
	Total	Grad	%	Total	Grad	%	Total	Grad	%	Total	Grad	%
CSE	128	95	74.2	130	113	86.9	134	116	86.5	177	148	83.6
ECE	131	109	83.2	126	113	89.6	145	120	82.7	138	118	85.5
IT	119	96	80.6	123	99	80.4	127	109	85.8	122	102	83.6
MECH	131	104	79.3	121	109	90	138	120	85.7	142	122	85.9
EEE	130	115	88.4	118	97	82.2	130	115	88.4	139	114	82.0
BT	116	112	96.5	78	75	97.4	109	105	96.3	99	95	95.9
AERO	69	63	91.3	57	44	77.1	59	53	86.8	65	53	81.5
AUTO	63	49	77.7	67	50	74.6	64	53	82.8	63	49	77.7
BME	63	53	84.1	56	50	89.29	57	54	94.7	52	49	94.2
Civil	NA	NA	NA	62	51	82.26	67	62	92.5	64	51	79.7
	950	796	83.7	938	801	85.4	1030	907	88.06	1061	901	84.9

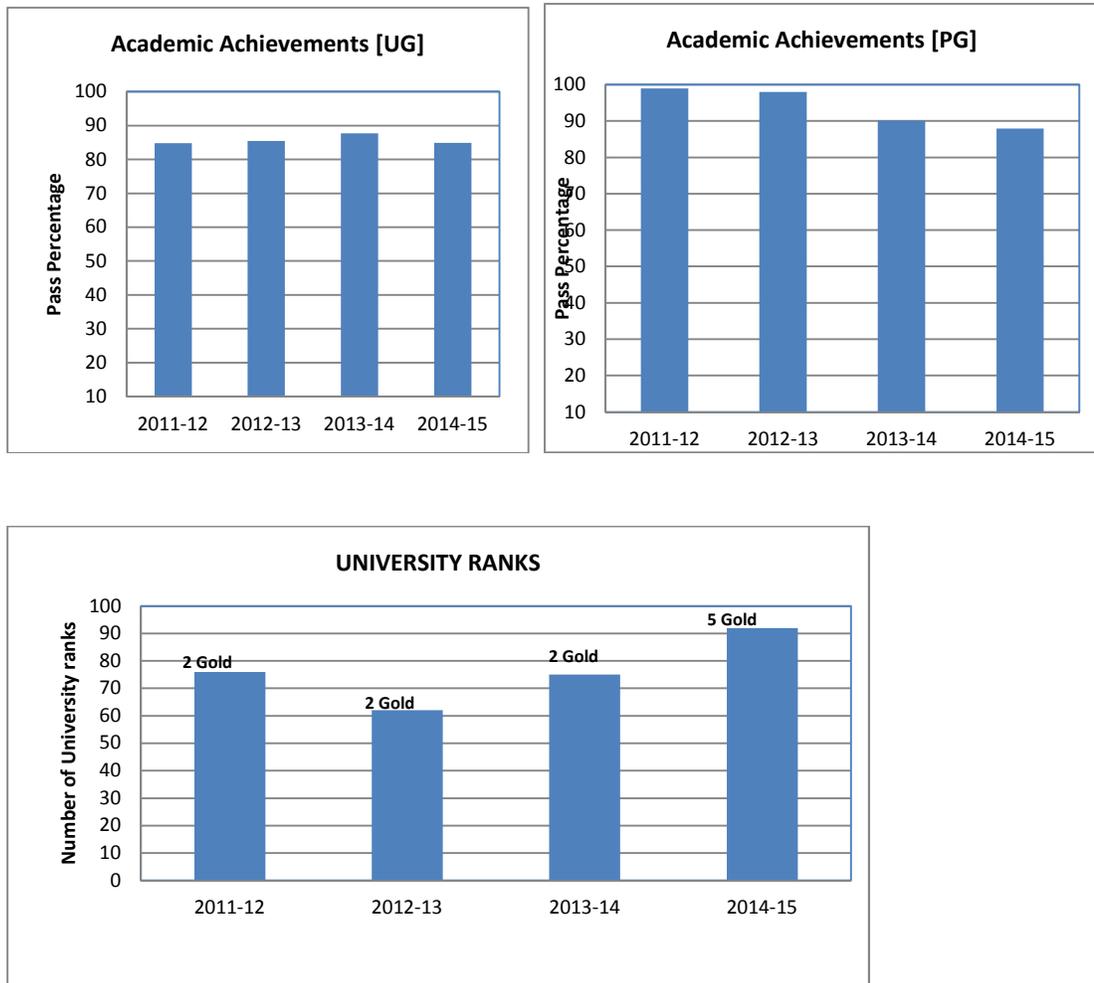
Result Analysis for PG course in the last four years												
Dept	Year of graduation											
	2012			2013			2014			2015		
	Total	Grad	%	Total	Grad	%	Total	Grad	%	Total	Grad	%
MBA	113	96	84.96	100	76	76.00	116	96	82.76	115	91	79.13
M.E. CSE	16	15	93.75	17	17	100.00	19	18	94.74	23	22	95.65
M.E. Comm Sys	18	18	100	16	16	100.00	14	13	92.86	18	17	75.56
M.E. Soft Engg	18	16	88.89	15	15	100.00	16	16	100.00	17	16	94.12
M.E CAD/CAM	14	13	92.86	NA	NA	NA	NA	NA	NA	NA	NA	NA
M.E. PED	17	17	100	14	13	92.86	18	17	94.44	16	16	100
M.Tech BT	18	18	100	15	15	100.00	14	14	100.00	11	10	90.91
MCA	49	46	93.88	84	69	82.14	65	60	92.31	36	35	97.2
M.E. Comm Sys(PT)	1	1	100	NA	NA	NA	NA	NA	NA	NA	NA	NA
M.E. Soft Engg(PT)	1	1	100	2	2	100.00	2	2	100.00	1	0	0.0
ME. ENGINEERING DESIGN	NA	NA	NA	8	8	100.00	12	11	91.67	15	15	100
ME. MEDICAL ELECTRONICS	NA	NA	NA	16	14	87.50	11	10	90.91	18	18	100
ME. EMBEDDED SYSTEMS	NA	NA	NA	NA	NA	NA	17	17	100.00	18	18	100

As seen from the above table, a good pass percentage of about 85% is maintained in the last four years and number of university ranks have also substantially increased for all the UG and PG programmes.

### 2.5.6 Details on the significant improvements made in ensuring rigor and transparency in the internal assessment during the last four years and weightages assigned for the overall development of students (weightage for behavioral aspects, independent learning, communication skills) etc.

- The College has set up an Examination Cell comprising of a senior faculty member and a team of teaching and non-teaching staff. The Cell conducts all the proceedings of the internal evaluation mechanism as per the schedule and procedure laid out by the affiliating University.

- As per the University directions, weightage is given to attendance, student performance in tests, assignments and classroom participation while deciding the internal marks.
- After the evaluation in a transparent and fair manner, the marks are entered in the SUPER software and University Web Portal as per the schedule.
- The evaluation system also makes space for Communication Lab, Presentation Skills, Technical Seminars and classroom participation of students.



**2.5.7 Does the institution and individual teachers use assessment/evaluation as an indicator for evaluating student performance, achievement of learning objectives and planning? If 'yes' provide details on the process and cite a few examples.**

Yes. The assessment is used as an indicator for evaluating students' performance as follows:

- There are certain course outcomes for every subject in the curriculum. The unit test question papers are set in such a way that it brings out whether these outcomes are met while evaluating the answer papers. For example if the subject relates to an in depth Analysis and Design, 80 % of the questions should relate to test these aspects, involving numerical calculations and 20 % on the connected theoretical descriptions and definitions.
- Students' performance is also studied carefully by the teacher to check whether the lesson plan given to them in the beginning of the semester and the pace of covering the syllabus are enabling the students' assimilation and retention.
- To some extent, the feedback given by the students in the class committee meetings is also helpful to conclude as to what extent the evaluation serves as an indicator of achieving the stated objectives.
- Viva questions are asked in the laboratory to enable the students to correlate the theory with the lab experimentation.

### 2.5.8 What are the mechanisms for redressal of grievances with reference to evaluation both at the college and University level?

#### College level Grievance redressal mechanism:

- Systems are put in place for the students to approach the subject teachers in case of clarifications.
- The entire examination proceedings are overseen by the College Examination Cell which also takes up the responsibility of redressing the grievances if any.
- Students can also approach the Principal in case of requirement.
- Liaison Officer is appointed by the Principal to interact with the University regarding the grievances of the students if the need arises.

#### University level Grievance redressal mechanism:

- University follows a well laid out process and procedure for evaluation
- A host of reforms have been implemented by the University to iron out the hardships for the students.
- Facility has been provided to the students to apply for photocopies of the answer scripts.
- Opportunity is provided to the students to go in for Challenge evaluation in case of discrepancies in the evaluation process.
- Challenge evaluation fee is reimbursed to the students in case of improvement in the grades in comparison to the first evaluation.\

## 2.6 Student performance and Learning Outcomes

### 2.6.1 Does the college have clearly stated learning outcomes? If 'yes' give details on how the students and staff are made aware of these?

Yes

- In tune with the Vision, the institution constantly strives to be one of excellence in Engineering, Technology and Management Education and Research. The learning

outcome is in providing to the nation, competent and ethical professionals with a concern for the society. All the planning and execution are directed towards meeting these objectives. These statements are printed in the college calendar, prospectus and magazine and prominently displayed in the main notice board.

- The course outcomes for each subject and programme outcomes framed by the department faculty are made known to the students and college assists the teachers to achieve these by proper support systems.
- Mapping of COs with the corresponding POs is achieved at the end of the semester.
- Projects are reviewed by industrial experts to oversee whether they are in tune with the learning outcomes.
- The importance of employability is insisted upon as one of the main learning outcomes.

### **Intended learning outcomes**

To achieve the stated vision and mission statements of the college, every programme has a set of programme outcomes which will also reflect the vision and mission statements of the department. Certain programme outcomes are meant for holistic development of students. Communication skills, presentation skills, softskills, complete human traits, emotional intelligence skills, Leadership qualities etc. The curriculum of the affiliating University is also strengthened wherever needed with value added programmes.

### **Broad National goals through curriculum and planning**

- Help them achieve the curricular goals
- Help them to acquire the skills earmarked for a degree and profession.
- Development of soft skills such as communication skills, presentation skills, completes human traits, emotional intelligence skills, leadership qualities etc.
- To make them environmental conscious
- To make them globally competent graduates with humane values to serve the society

## **2.6.2 How are the teaching, learning and assessment strategies of the institution structured to facilitate the achievement of the intended learning outcomes?**

- Recruiting the best candidates as teachers for the institution.
- The academic year is preplanned by providing enough working days for teaching the syllabus and conducting the planned value added programmes.
- Academic and research programmes, library, labs, seminar halls and indoor stadium etc., facilitate the teaching learning process.
- Exam cell is established to compile the question papers and prepare the time table for all the departments and conduct exams in a centralized system.
- Co-curricular activities are organized to promote students' confidence.
- Encouraging innovative projects and providing facilities to carry out them.

### 2.6.3 What are the measures/initiatives taken up by the institution to enhance the social and economic relevance (quality Jobs, entrepreneurship, innovation and research aptitude) of the courses offered?

**Quality jobs:** Suitable value addition programs to fill the curricular gaps, employability training camps, industrial visits, guest lectures, in-plant trainings and effective practical sessions are organized to obtain quality jobs in core areas.

Relevant internal projects and industrial projects are arranged for students.

Guest lectures by industry experts and REC and IIT alumni assist students to gain good knowledge in the relevant courses.

Students are encouraged to do projects with social and economic relevance.

Teachers who undergo sabbatical training give additional support to the students in their projects.

**Entrepreneurship** – ‘Earn while you learn’ is one of the entrepreneurship initiatives of the institution. An ‘Aavin Parlour’ functions in the campus, solely managed by students. Entrepreneurship Development Cell with NEN (National Entrepreneurship Network) organizes programmes and motivates and helps students to acquire entrepreneurial skills. An E-Week is also conducted to impart this skills and management techniques to the students through lectures by successful entrepreneurs.

**Innovations:** A.P.J. Abdul Kalam Innovative Project Cell (IPC) of the college organizes ‘iQuest’ – a contest for innovative ideas and projects, every year for motivating the creative talent of the students.

**Research aptitude:** Research aptitude of students is kindled right from the first year of graduation through IPC and also by encouraging students for course relevant in-house projects and final semester projects and guiding in preparing and presenting technical papers in seminars and conferences.

#### Students’ Innovations

##### All Terrain Baja Vehicle Robot



##### Pneumatic Doormat



##### Pick and Place



#### 2.6.4 How does the institution collect and analyze data on student learning outcomes and use it for planning and overcoming barriers of learning?

Performance of students in the university exams is an indicator of students' learning outcomes. After the announcement of every semester results by the university, a thorough analysis is done. Subjects in which performance needs further improvement, the causes for the same are analyzed and remedial measures are planned. Tutorial classes and expert lectures are arranged for the students and teachers are also given special training programmes so that the barriers are overcome.

- At the end of the semester, feedback is collected on the attainment of course outcomes for each course and it helps in rectifying the weakness in the teaching-learning process, in the subsequent offering of the particular course.
- Feedback on the attainment of Program Outcomes collected from the graduands (exit feedback) also helps in identifying the shortcomings and taking steps to rectify them for the subsequent batch of students.

#### 2.6.5 How does the institution monitor and ensure the achievement of learning outcomes.

The chairman of IQAC, the Principal in consultation with the Vice-Principal and Advisor convenes regularly the meetings with heads of the departments to monitor and ensure the following learning outcomes.

- Through continuous assessment (unit tests, retests, assignments)
- Class committee meeting reports
- Internal and external academic audits
- Project reviews and laboratory viva-voce sessions and also in-plant training reports used both for assessment and giving added inputs to ensure the achievements of learning outcomes.
- Feedback from stakeholders

#### 2.6.6 What are the graduates attributes specified by the college/affiliating University? How does the college ensure the attainment of these by the students?

**The major graduate attributes are**

- Employability
- Societal awareness
- Global working abilities

##### **Employability**

An important graduate attribute being readiness for employability, it is taken care of by well planned residential "Employability Training Camps" conducted by the Department

of Training and Placement for the Third Year students during summer and winter vacations, wherein they are given training on varied skill sets.

The department also helps the second year students in getting opportunities in appropriate industries for undergoing in-plant training for learning industrial practices which is yet another essential graduate attribute.

**Societal awareness** created in students through organizing community services (NSS, YRC, ENACTUS, and Rotaract etc)

**Global competence** through organizing skill development programmes, language proficiency courses (English, German, French) and encouraging International participation.

#### **Any other information**

The tag line for a teacher is – once a teacher, ever a student in life long learning. The College strongly believes in continuous learning and improvement. The institution makes all possible efforts to be a learning organization and is interested in organizational learning. Hence all the efforts and strategies are aimed at continuous improvement.

**CRITERION III****RESEARCH, CONSULTANCY AND EXTENSION****3.1 Promotion of Research****3.1.1 Does the institute have recognized research centers of the affiliating University or any other agency/organization? If yes give details on the research centers and the facilities available.**

**REC is an established centre for Research and Innovation among the academia in the field of Engineering. REC lays great emphasis on Research and continued innovation. All efforts are made by the institution to promote research culture in the campus. As a result of concerted and continuous efforts in this direction, the following are the noteworthy achievements:**

- **Nine** departments are recognized as ‘Research Centers’ by Anna University, viz; the Departments of Computer Science and Engineering, Mechanical Engineering, Electrical and Electronics Engineering, Electronics and Communication Engineering, Information Technology, Biotechnology, Biomedical Engineering, Chemistry and Mathematics.
- Many faculty members are carrying out their research in core and applied research areas in these centers and full-time/part-time Ph.D./ M.S. (by Research) scholars are doing research in these centers.
- The Departments identified as Research Centres are well equipped with state-of-the-art equipments to carry out research activities and are also well connected with industries/research organizations.
- All departments are provided with internet connectivity for accessing research papers published in reputed journals and international conferences across the world.
- The Department of Scientific and Industrial Research (DSIR), Government of India has recognized the College as a Scientific and Industrial Research Organization (SIRO), considering its potential for Research and Development activities.
- The College has been conferred with 12 (B) status by the University Grants Commission, for carrying out extramural research grant-in-aid projects from the commission.
- MEMS Research Lab which has been established in the year 2009 under the NPMAS programme in which various software like MEMS CAD tools: Intellisuit – 2 Licenses, COMSOL 4.1 – Class Kit License, Tanner EDA tool – L-Edit, Convector wave 2010 and MEMS+2.0 are available . Fabrication Facilities: Wetlab, Porous silicon formation setup, Semiconductor Device Analyzer, LCR Meter have been acquired.
- Unified Technology Learning Platform Centre was established in the institution with the support from WIPRO MISSION 10X.

The focus of this initiative is to:

- Improve laboratory infrastructure by bringing industry relevant technology to enable higher level of learning in students.
- Foster integrated learning by providing multiple industry relevant interfaces.
- Enable students to take up industry relevant projects.
- Encourage faculty to take up research by providing ability to add customer logic.

M/S. Robert Bosch has signed an MoU with Rajalakshmi Engineering College in the Year 2012 and the Bosch REC Training Center was inaugurated in March 2013. In this centre training is provided for 3<sup>rd</sup> Year and Final Year Mechanical and Automobile Students of REC. Training is given to the Students in the Following Modules

- Fuel Injection Pumps
- Automotive Electricals
- Vehicle Air-conditioning
- Vehicle Engine Diagnostics
- **Centre for Excellence in Machine Vision (CEMV):**
- CEMV was set up in the college to develop Machine Vision technology for deployment in industries and to pursue Research Activities in Machine Vision. It undertakes industrial consultancy projects involving designing and developing customized Machine vision systems and solutions.

**Refer Annexure- 12**

### 3.1.2 Does the Institution have a research committee to monitor and address the issues of research? If so, what is its composition, mention a few recommendations which have been implemented and its impact.

The College has a Research and Consultancy Advisory Board (RCAB) to monitor and address the issues of research and the composition is as follows,

S. No.	Name	Designation
1	Dr. C. R. Muthukrishnan	Chairman – RCAB, Advisor-REC
2	Dr. R. Sundar	Head-RCAB, Professor / ECE
3	Dr. L. Sujatha	Advisory Expert, Professor / ECE
4	Dr. Natteri. M. Sudharsan	Advisory Expert, Professor/ Mechanical
5	Dr. S. Mohamed Yacin	Advisory Expert, Professor/ Biomedical
6	All the PhD holders in the college	Members - RCAB

Based on the recommendations made by the Research and Consultancy Advisory Board

- Suitable training programmes are suggested for staff and students.
- The committee continuously reviews the work of Ph.D. research scholars.
- Various National and International conferences in emerging areas are organized.
- Faculty members are preparing and submitting research proposals to various funding agencies.
- Internal assessment of the research proposals are done by the advisory experts from RCAB.
- As a result of focused and coordinated efforts of RCAB, 40 minor research projects were submitted to UGC and as many as 21 projects were sanctioned for the year of 2014-15.
- Possible arenas in the emerging areas of technological research were mapped and proposals are being shaped with the assistance from RCAB.
- The number of project submitted to different agencies for funding is steadily increasing every year with the support of RCAB.
- RCAB is entrusted with the task of identifying and recommending the projects which are suitable for internal funding.

The details of internally funded projects are given in the table in 3.2.2

### 3.1.3 What are the measures taken by the Institution to facilitate smooth progress and implementation of research schemes/projects?

Autonomy to the principal investigator	- Yes
Timely availability or release of resources	- Yes
Adequate infrastructure and human resources	- Yes
Time-off, reduced teaching load, special leave etc. to teachers	- Yes
Support in terms of technology and information needs	- Yes
Facilitate timely auditing and submission of utilization certificate to the funding authorities	- Yes

- In view of the research activities carried out, the college is recognized by Department of Scientific and Industrial Research (DSIR) as Scientific and Industrial Research Organization (SIRO), first time in 2009, and subsequently renewed in 2012. Renewal of SIRO from 2015 has been sanctioned.
- The college also funds internal R & D projects to faculty members on the basis of recommendation from Research Board.
- The faculty members are given the freedom to carry out their projects independently along with their team, so as to devote time for research. The team comprises UG and PG students, research scholars and faculty members.
- Permission to attend conferences and bilateral visits are always encouraged and registration fee and travel grants are also sanctioned.

- Knowledge Management Cell of the institution is entrusted with the task of providing conveyance for attending conferences, seminars and publishing research papers. Rs. 6,60,565/- has been spent by the institution for the past academic year 2014-2015
- The purchases are taken care of by the Purchase Committee and the administration based on the specifications required by the concerned researchers.
- The major research facilities are MEMS design centre, TIFAC CORE Labs in the area of Machine Vision, Robotics lab, and Think labs for embedded systems, IBM Centre of Excellence and BOSCH – R &D labs. The college has subscribed to major online journals like IEEE, Nature, Science Direct etc.
- The college is certified by ISO 9001: 2008 standards and auditing is done annually by the certified auditors of the college.

### 3.1.4 What are the efforts made by the institution in developing scientific temper and research culture and aptitude among students?

The institute promotes scientific temper and research culture among the faculty and students. Vision of RCAB is “Establishing an ambience that facilitates the development of thrust areas of research in REC”. Institute takes the following efforts:

- Motivates students with internal funding to take up innovative projects so that they can plan their career in research. Few examples are as follows:

SI No	Department	Name of the students	Project Title	Funding Agency
1	Biomedical Engg	Parthibarajan (2006 to 2010)	Bed that Prevents Bed Sores	REC
2	Mechanical Engg	Sai Prasath and Srivatsan (2004 to 2008)	All Terrain Car	REC
3	Biotechnology	R.Premkumar, S.Naveedh Ahmed, S.Manojkumar (2010-14)	Design of Inverse Fluidised Packed Bed Reactors	REC
4	Biotechnology	T.Ashwin (2011-15)	Design and Optimization of Microbial Fuel Cells	REC

- The activities of the student society - Science, Technology, Engineering and Mathematics (STEM) education is to encourage the students' role in technology development through better learning and understanding of the practical concepts. STEM initiated by students is supported by the Management.

- Innovative Project Cell is a dedicated student service cell, focusing on identifying activities that shall promote and nourish the skill of innovation amidst the students. Every year it organizes “i-Quest”, annual presentation event which showcases the talent of the students.

#### List of prize winners of i-Quest 2014 and 2015

Sl. No.	Event	Judges	Prize Winners	Title of the Project
1	IQuest 14	Mr. Virupakshan Manager, Infosys	Amrinthambala, AshokPandian C, Jayadev J	Antibrowning of Flowers using Natural PPO Inhibitors
2	IQuest 15	Mr. R.Krishnamurthy Rao, Senior Consultant, IIT Alumni Interaction Center.	Vaitheeswaran S, Vignesh S and Srivatsa Mukunth, IV year EEE Department, who worked on	“Electrically Automated Transmission System in Automobiles” .

- The winners of these events are awarded with a cash incentive of Rs.10,000/- prompting to promote interest amidst students in research
- Through the efforts of IPC, students along with teachers come up with their innovative ideas that blossoms in to new projects and then on to products. Subsequently, steps are taken to apply and secure patents. In the year 2014-15, Students from the department of Auto Mobile Engineering, R.Gauthaman and C.Raghavan with guidance from Dr.K.Bhaskar, Professor, Auto Mobile Engineering have filed patent titled “Method of continuously varying opening and closing angles of the valves of an Internal Combustion Engine”
- Various programmes are conducted time to time to promote scientific temper and aptitude among students.
- Many such programs are interdisciplinary and so attended by students of allied departments. Some of them are as follows:

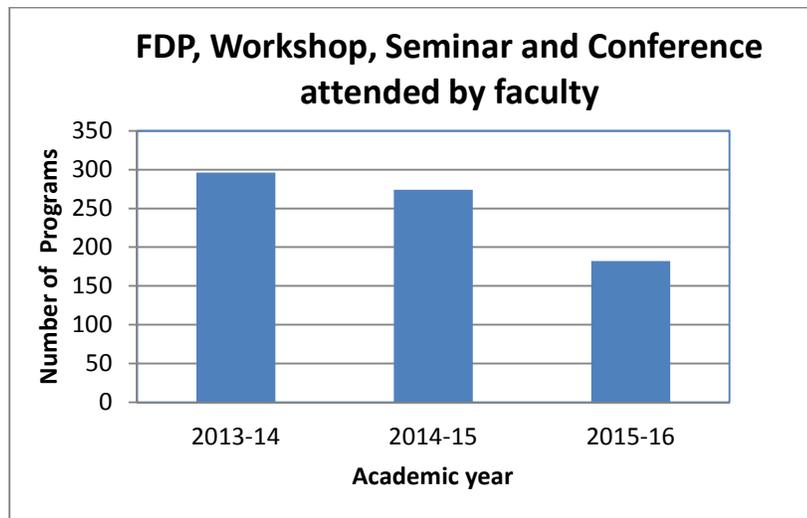
Sl No	Date(s)	Title	No of student participants	Organising Department
1	26 Aug 2014	One day Seminar on “Advances in Helicopter Technology”	200	AERO
2	21 Sep 2014	Workshop (2 days) on Quad rotors	60	AERO
3	30 Jan 2015	AERO QUIZ 2014	36	AERO
4	25 Jul 2014	SAE Student convention Tier I 2014 - Event	118	AUTO

5	24 Aug 2014	Turbo 2014 - Symposium	700	AUTO
6	03 Mar 2015	Three days workshop on Advanced systems in Automobile Engineering with Open ECU	80	AUTO
7	13 Feb 2015	'Study of the effects of microwaves on human head phantom'	30	BME
8	20 Feb 2015	'Detection of neovascularization in sdoct retinal images for screening diabetic retinopathy'	30	BME
9	27 Feb 2015	'Real Time Secured Transmission of Biosignal using Chaotic Communication System'	30	BME
10	06 Mar 2015	'Mathematical Modelling of Left Coronary Artery Using Lumped Parameter Model'	30	BME
11	20 Mar 2015	'Detection of melamine in milk products using silver nano particles'	30	BME
12	13 Mar 2015	Analysis of breathing sounds of obstructive sleep apnea patients during wakefulness using support vector machine	30	BME
13	20 Feb 2015	Workshop titled "Usage of PhysioNet Data Base for Biomedical Research"	30	BME
14	28 Jan 2015	Workshop on MEMS CAD tools	120	BME
15	28-30 Jul 2014	Work shop on "Introduction to the use of Vivarium"	127	BT
16	27 Jan 2015	Workshop on "CLIMATE LEADERSHIP"	300	BT
17	07 Mar 2015	RACE PRO- 2015 (Model Making contest)	350	CIVIL
18	24 Mar 2015	3D Modeling of Civil Engineering Structures	120	CIVIL
19	23 Aug 2014	FISA -14 Symposium	1015	CSE
20	06 Feb 2015	Selected topics of Design and Analysis of algorithm	204	CSE
21	31 Jan to 07 Feb 2015	BIG DATA training programme	100	CSE
22	23-24 Mar 2015	"PC Assembly and Troubleshooting"	93	CSE
23	29 Sep 2014	Embedded System and its Application	120	ECE
24	28-29 Jan 2015	6 <sup>th</sup> National level workshop on "MEMS Technology and its applications"-MEMSTA 15	111	ECE

25	15-17 Jul 2014	Workshop on Digital Image Processing	30	IT
26	02 Sep 2014	Workshop on Selenium Testing Tool	60	IT
27	30 Nov 2014	FDP on Risk Management in Software Engineering Mr.Ananda Narayanan, Consultant TCS delivered a talk on the topic	70	IT
28	01 Dec 2014	Seminar on Big O Notation & NP complete	45	IT
29	28-31 Jan 2015	Mobile Application Development	39	IT
30	21 Feb 2015	Mobile Application Development using IBM worklight Development Tools	60	IT
31	09 Feb 2015	Certification Examination for IIT Spoken Tutorials in C & C++	45	IT
32	12 Mar 2015	IIT Spoken Tutorials in Java	40	IT
33	09-25 Mar 2015	Python Webinar Series	40	IT
34	14 Mar 2015	CSI National Programming Contest	90	IT
35	20 Mar 2015	INNOVISION 2k15	250	IT
36	07 Feb 2015	Workshop on Big Data Analytics	60	IT
37	05 Feb 2015	IITB Spoken Tutorial on LaTeX	30	IT
38	10 Nov 2014	Structuring a Final year Internship / Project, Review of Literature, explanation on Research work with usage of statistical tool Methodologies	115	MBA
39	09 Oct 2014	One day workshop on “Database design and development” by Mr. V. Harihara Puthran, Consultant, DTCC	35	MCA
40	1-2 Dec 2014	Skill Improvement Programme on DBMS by Ms.Anu Barathi/MCA	46	MCA
41	3-9 Dec 2014	Skill Improvement Programme on Communication Skills	46	MCA
42	10-12 Dec 2014	Skill Improvement Programme on PHP and MySql By Ms.N.M.Kavitha/MCA	46	MCA
43	14-16 Jun 2014	Training for ASOP Students @ Yellagiri	24	MECH
44	11 Oct 2014	IIW Welding Technology	92	MECH

45	28 Feb 2015	INGENIOUS 2015	563	MECH
46	03 Oct 2015	Krida –yanthrik –Technical Symposium	150	MECH

- Faculty members are deputed to attend faculty development programmes, summer/winter workshops to interact with external world and enrich their scientific knowledge.
- Travel allowance is provided to faculty and students in attending National and International conferences and encourage them to do research and gain knowledge in latest developments.
- Workshop on writing effective thesis and research papers is organized periodically for students. Workshop on writing project proposals and research papers is also organized regularly for faculty members by internal and external experts



- Experts from Research organizations, reputed international and national institutions are invited for talks and interactive sessions on their areas of research.
- Around 100 Special lectures by eminent personalities from academia and industry are being arranged every year to kindle the research interest of students and faculty members in various fields. To name a few the following examples are given for the academic year 2014-15:

S.No.	Name of the speaker	Affiliation	Topic of the talk	Date
1	Prof. S.K. Sharma	Dongguk University, South Korea	Li- Ion Batteries	February 27 2015
2	Dr. M.P. Koushik	Former Director, DRDE	Emerging Technologies for Bio-Sensors	February 27 2015
3	Dr.S.K.Koul	SSPL, DRDO	Clean Room: Basics & Design	October 31 2015
4	Dr.M.U. Sharma	SSPL, DRDO	Saw Technology Devices and Sensors	October 31 2015

5	Prof. Ravishankar	University of South Florida	Advanced Wearable sensors & Technologies	December 09 2015
6	Pallavoor Vaidyanathan	University of Central Florida	Academic and Research Opportunities in UCF	December 11 2015
7	Ar.M.Thirumeni,M.Arch. , (IITK)	Architecture Department, SRM University	Architecture for Civil Engineers”	3-Mar-15
8	Dr. V. Jagadish Kumar,	Electrical Engineering, Head, Central Electronics Centre, IIT – Madras	Research – An Engineer’s Odyssey	29-Jul-15
9	Dr. Sanjeev Kumar Sharma,	Dongguk University, Seoul, South Korea	Nanotechnology and its applications in Engineering	19-Feb-14
10	Ms. Nandini.N.	University of Duke’s, United States.	Interactive session on Academic Excellence	2-Jul-14
	Ms.Monisha.P.Lund	University of North Carolina,		
	Ms. Sneha. K.Y	University of Texas. USA		
	Ms. Sruthi .S	University of North Carolina, United States		
11	Dr.S T G Raghukanth	Structural Engineering Division,IIT Madras,	Mechanics of Soilds	8-Aug-14
12	Dr. Manu Santhanam	ProfessorCivil Engineering Department, IIT Madras.	"Construction Materials"	22-Dec-14

- International and national conferences on topics of global significance are organized to provide world-wide exposure to students. To cite few examples:

Sl. No.	Academic Year	Particulars of the events	Date(s)
1	2014-15	An International Conference on “Power Electronics and Renewable Energy Systems” (ICPERES – 2014) was organized by the Department of Electrical and Electronics Engineering.	24 Apr 2014
		An ISTE sponsored Regional Conference on “Innovations in Engineering Education and Research” was organized by the Departments of Electrical and Electronics Engineering and Information Technology	14-15 Nov 2014
		National Conference on Recent Trends and Development in Radiation Dosimetry was organized by the Department of Biomedical Engineering in association with IGCAR, Kalpakkam.	09 Oct 2014
2	2013-14	An Interfinish-SERIA 2013 Asia Pacific, International Conference on “Surface Engineering for Research and Industry Application was conducted in association with International Union for Surface Finishing and Singapore Surface Engineering Association.	07-09 Aug 2013

- Students are encouraged to present papers in conferences outside the college too. Some of the students have even win best paper awards in conferences. For example, Christopher Bharath and Prithvi Natarajan, Students of Aeronautical Engineering department won the “Spirit Aero systems Global Design Challenge” award in 2012-13 for their project “Fuselage Design of Passenger Airliner”
- CEMV periodically organizes awareness and training to students such as Hands-on workshops in implementation of Machine Vision Systems. Intensive workshops in Image Processing for Machine Vision

### 3.1.5 Give details of the faculty involvement in active research (Guiding student research, leading Research Projects, engaged in individual/collaborative research activity, etc.)

- As Research guides of Anna University, the faculty are involved in guiding M.S. and Ph.D. scholars.
- Many faculty members apply for funded projects in which they are principal/co-investigators.
- Teachers guide UG and PG students’ in their final semester and in-house projects.
- As Innovative Project Cell coordinators, they guide and motivate students to participate in the college innovative project competition named’ i- Quest’
- Dedicated research and development centers within the institution such as National MEMS Design Center and Centre for Excellence in Machine Vision (CEMV) involve themselves in research in their respective areas.

### 3.1.6 Give details of workshops/ training programmes/ sensitization programmes conducted/organized by the institution with focus on capacity building in terms of research and imbibing research culture among the staff and students.

Institute organizes several programmes periodically on capacity building to imbibe research culture among the staff and students to enhance their ability to identify and meet challenges. Few of the programmes organized by the institution are as follows:

S.No	Program	Organized by	Date
1	Workshop on Micro Machining Technologies and MEMS CADD tools	MEMS Design Center	16 <sup>th</sup> to 18 <sup>th</sup> June 2014
2	Workshop on Image Processing and MATLAB.	Centre for Excellence in Machine Vision	25 <sup>th</sup> to 30 <sup>th</sup> August 2015

- Students attending these workshops are motivated to do their final year project in Machine vision and MEMS and then they are guided by experts at CEMV and CMMF.
- MEMS Design Center conducts summer training programs to the students from both within and outside the institution and the program receives consistent support from the participants year after year.
- CEMV regularly conducts workshops and training programs in the areas of Image Processing and MATLAB. Students attending these workshops are motivated to do their final year project in Machine vision and then they are guided by experts at CEMV.
- BOSCH REC Training Center conducts various workshops on Fuel Injection Pumps Automotive Electricals, Vehicle Engine Diagnostics for different duration etc.,
- Department of Biomedical Engineering organised a National Seminar on Radiation Dosimetry in association with BRNS, Mumbai, a workshop on ‘Usage of PhysioNet Data Base for Biomedical Research’ and National Seminar on Early Diagnosis of Human Pathological Conditions Using Medical Infrared Imaging.
- ‘REC Ekalavya e outreach program’ - remote centre organised a workshop on ‘How to write technical papers/thesis effectively’

### 3.1.7 Provide details of prioritized research areas and the expertise available with the institution.

List of faculty members and their prioritized research areas available with the institution:

S.No	Name of the Faculty	Dept.	Area of Research
1	Dr.M.Selvakumar	Civil	Air Quality Modelling
2	Dr.S.Geetha	Civil	Lightweight Aggregate
3	Dr.P.S.Venkatanarayanan	AERO	Nanocomposites
5	Dr.G.Sujitha	CSE	Forensics,Big Data Analytics
6	Dr.S.Chandrakala	CSE	Bio-Informatics Video Processing
10	Dr. K. Bhaskar	Automobile	IC Engines

12	Dr.G Thanigaiarasu	Mech	Science & Materials
14	Dr. S. N. Murugesan	Mech	Thermal Science
16	Dr. S.P. Srinivasan	Mech	Supply Chain Management
17	Dr. Natteri M.Sudharsan	Mech	Computational Heat Transfer
18	Dr. N.Venkateshwaren	Mech	Composites
23	Dr.R.Kalaivani	EEE	FACTS device and Voltage Stability
24	Dr. M.G. Umamaheswari	EEE	Electrical Machines
25	Dr.A.Selvaraj	EEE	Voltage Sag in Adjustable Speed Drives
26	Dr. N. Gunasekaran	ECE	Microwave Engineering
27	Dr.Sundar.R	ECE	Speech Processing
28	Dr.L.Sujatha	ECE	Micro Electronics & MEMS
29	Dr. S. Mohamed Yacin	Biomedical	Biosignal Processing, Medical Devices
30	Dr. R. Kalpana	Biomedical	Bio electromagnetism
31	Dr. Sheila Anand	IT	Information Security
32	Dr. S. Poonkuzhali	IT	Data mining
35	Dr.Johanna Rajkumar	Bio-Tech	Clinical Biochemistry
39	Dr.P.Rajasekar	Bio-Tech	Nano Biotechnology
45	Dr. D HariPriya	Bio-Tech	Clinical Bio chemistry
47	Dr.C.B.Ragothaman	MBA	HR Management
49	Dr.K.R.Sowmya	MBA	HR Management

### 3.1.8 Enumerate the efforts of the institute in attracting researchers of eminence to visit the campus and interact with teachers and students?

The institute makes concerted efforts to attract researchers of eminence from academic and industrial background to visit the campus and interact with faculty members and students through national and international conferences organized by the departments, seminars, workshops and innovative project competitions. To name few of the experts who visited our campus are,

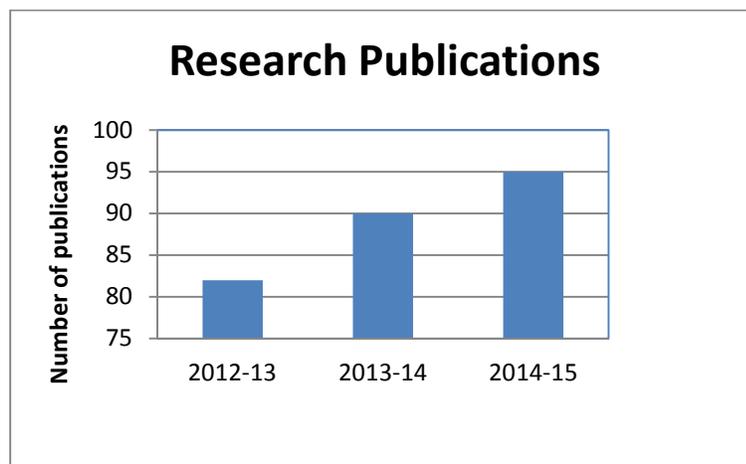
- **Dr. S.K. Sharma**, Professor of Dongguk University, South Korea, visited oNational MEMS Design center on 19 Feb 2014 to initiate the joint collaboration under Indo-Korean research partnership project
- **Dr. M.P. Koushik, Outstanding scientist and Former Director –DRDO**, Ministry of Defence, Government of India, visited the campus on February 27<sup>th</sup> 2015 and delivered a guest lecture and accelerated research activities in the campus.
- **Dr. A. Sivathanu Pillai, Distinguished Scientist, Chief Controller R&D, DRDO**, Ministry of Defence, Government of India and Chief Operating officer & Managing Director BrahMos Aerospace, was the chief guest for an international conference on Biomaterials Implant Devices and Tissue Engineering (BIDTE-2012) and visited again our campus during November 2014.
- **Professor Perambur Neelakanta from Florida Atlantic University** visited the campus thrice for delivering talks.
- **Dr. Kanakasabapathi Subramanian, Ph.D., Chief Executive Officer**, Powergear Limited, Chennai visited our campus on 08-09-2014 to inaugurate i-quest competitions organised by A.P.J. Abdul kalam Innovative Project Cell.

- **Dr. M.U.Sharma, Dr.S.K.Koul**, Associate Directors, **Solid State Physics Laboratory, DRDO** visited our campus on October 31st 2015 for delivering guest lecture on SAW devices. He interacted with RCAB Members and Research Scholars on various aspects pertaining to their research projects.
- On several occasions scientists from IGCAR have visited the campus to deliver lectures on nuclear energy and allied engineering areas.

### 3.1.9 What percentage of the faculty has utilized Sabbatical Leave for research activities? How has the provision contributed to improve the quality of research and imbibe research culture on the campus?

The College is committed to provide all the required assistance to the teachers for pursuing research and innovation. As a learning organization, it lays great thrust on the promotion of research.

- 13-17% of the faculty have been sanctioned leave for research activities.
- The Ph.D. scholars on sabbatical leave are able to evince full concentration and complete their research degree successfully.
- Leave with pay is given to the faculty members for research activities. This provision has contributed in a significant way to the promotion of research culture on the campus.
- 72 faculty members have successfully obtained Ph.D. degree after joining REC while 116 members have registered for Ph.D.
- A Few of the faculty members successfully completed postdoctoral programmes.
- 21 faculty members have received funding for their research proposal under UGC minor research projects.
- Various funding schemes have enabled researchers to publish their findings in reputed journals.



The above graph shows research articles presented in National and International Journals during the Academic years from 2012 to 2015.

**3.1.10. Provide details of the initiatives taken up by the institution in creating awareness/advocating/transfer of relative findings of research of the institution and elsewhere to students and community (lab to land)**

- Research and Consultancy Advisory Board signed a Memorandum of Agreement with National Research Development Corporation - Govt. of India for promotion, dissemination and exploitation of technology leading to patents and research publications.
- The salient features/findings are voiced through department newsletters, journal publications, presentations in conferences and seminars, publication in IPC and innovations at REC booklets and in public forums.
- There is a plan to bring out an institutional research journal in the near future in Engineering, Science and Technology.
- Research and Consultancy Advisory Board encourages departments to take up consultancy work with industries and also facilitate the connected processes.

Some of the research findings and the technology developed have been transferred to industries also. For example:

- Department of Biotechnology along with CARE and CURE Pvt. Ltd. Chennai conducted a study on the efficacy of Amber based herbal formulations for various conditions like Hyperlipidemia, Myocardial Infarction and also hepato protective action in drug induced toxicity.
- Department of Information-Technology of the college provided consultancy on Electronic Social Network for employees of Mando India Limited, SIPCOT Industrial Park, Irungattukottai, Tamil Nadu.
- Department of Biomedical Engineering has developed an automatic pill alert and monitoring system, a pre-programmed compact device that is loaded with appropriate pills to give audio-visual alerts at regular timings each day. A Patent has been filed on this invention.
- Department of Biotechnology of the college has developed a cleaning chemical and as a part of technology transfer, it had been transferred to Visoka Engineering Private Limited, Sriperumbudur.

**3.2 Research Facilities and Resource Mobilization**

**3.2.1 What percentage of the total budget is earmarked for research? Give details of major heads of expenditure, financial allocation and actual utilization.**

Percentage of the total budget earmarked for research  $\approx 2.5\%$

For R&D Activities	Capital	Revenue expenditure other than salaries (in Lakhs)	Salaries (in lakhs)	Others (in Lakhs)	Total Expenditure (in Lakhs)
2011-12	38.9	6.86	27.22	0.00	72.18
2012-13	40.06	22.44	69.55	0.00	132.06
2013-14	53.43	17.13	56.43	0.00	127.0
2014-15	29.61	9.55	64.86	4.05	108.7

**3.2.2 Is there a provision in the institution to provide seed money to faculty for research? If so, specify the amount disbursed and the percentage of the faculty who has availed the facility in the last four years?**

There is a provision in the college for interested faculty members to get seed money for starting their research work. The details are given below:

S.No	Description	Estimated Equipment Cost (in lakhs)	Consumables & Contingencies (in lakhs)	Key Faculty	Departments that will use the facility
1	Wireless Sensor Network	9.50	0.50	Dr. Sheila Anand (IT) Dr.M.Palanivelan Dr.Geetha Ramani Prof . Subrahmanyam Prof.B.Swaminathan Ms.Uma Maheswari (CSE Ph.D scholar & AP RIT)	CSE, IT, ECE, MCA, Biomedical Engineering
2	RFID Applications Lab	7.20	1.20	Dr.L.Sujatha (ECE) Ms.Revathy.M Ms.JoselinJeyaSheela Prof.Subrahmanyam.K	ECE, CSE, IT, MCA
3	Biomedical Signal & Image processing Laboratory	4.20	0.75	Dr. Mohamed Yacin Ms. R Kalpana Mr.R.Premkumar Ms.N.Padmasini Ms.A.N.Nithya	Biomedical Engineering

4	High Speed jet flows	12.0	0.30	Dr. S. Elangovan Suresh Chandra Khandai	Aeronautical Engineering
5	DI Water Plant with Pre-filtration unit	4.5	0.37	Dr. R.Sundar Dr. L.Sujatha	ECE, Bio-Tech, Bio-Medical, Chemistry
6	Clean Room Facility for Semiconductor and Microelectronic Device Fabrication	45		Dr. R.Sundar Dr. L.Sujatha	ECE, Bio-Tech, Bio-Medical, Chemistry

Institution provides ‘on duty’ (OD) permission for faculty doing Ph.D. in other research centres. Each faculty member is eligible to avail Rs.5,000/- per annum to attend conferences, seminars and workshops etc. The percentage of faculty who have availed this facility is around 95%. Those who require more than Rs.5,000/- need to apply for participating in any specific programme.

### 3.2.3 What are the financial provisions made available for supporting student research projects?

- Every year the institution awards Rs.10,000/- per department for the best final semester project.
- Best innovative projects are funded by the institution for implementation.
- Lab, library and internet facilities are made available for students’ research.
- Winners of i-Quest are awarded with cash and certificate of merit during the college day.
- As and when the students approach for specific projects, the college gives adequate support.

Details provided in section 4.2 and 5.3 are also relevant to this point.

### 3.2.4 How does the various departments/units/staff of the institute interact in undertaking inter-disciplinary research? Cite examples of successful endeavors and challenges faced in organizing interdisciplinary research.

REC has many strong research areas. Efforts are taken consistently to strengthen these areas and to develop new areas. Interdisciplinary projects are encouraged in the campus. For example TIFAC – CORE’s Machine Vision involves IT, EEE, ECE, Biomedical, Automobile Engineering, IT and various industries. Interdisciplinary projects are encouraged in the campus.

Some of the other collaborative attempts include the following:

- The project “Thermography as a tool to detect abnormality in fetus” is an inter disciplinary project involving faculty from Mechanical and Biomedical Engineering

- The project ‘Biosensors for Biological Applications’ is an interdisciplinary project wherein experts from ECE, Chemistry and Biotechnology are involved.
- The project “Structural Health Monitoring Sensor” is an interdisciplinary project developed by experts from MEMS Design centre and Civil Department of the college.
- The project “Study on Micro-fluidic devices” is an interdisciplinary project involving faculty from ECE and Mechanical engineering
- A project “Development of future generation Li-ion batteries with nanostructured silicon based anode materials” under Indo-Korea joint collaboration promoted by DST-GoI, involving Dr. L. Sujatha, Dr. R. Sundar of ECE department of our college is being carried out with Dr. Deuk Young Kim of Dongguk University-South Korea and Dr. S. K. Sharma of Department of Semiconductor Science, South Korea.

### 3.2.5 How does the institution ensure optimal use of various equipment and research facilities of the institution by its staff and students?

The laboratory and library facilities available in the campus can be utilized by the staff and students involved in research with no time restriction. Log books are also available to record the usage.

- Facilities in R&D centre of our college are also allowed to be used by research students from other colleges. Research Scholars from other colleges approach our R&D Centre with endorsements from their Guides and upon scrutinizing the applications, Head of Research Board permits to use the facilities. As a policy, students are allowed to utilize the facilities at free of cost.

Through various structured certification programs the facilities in MEMS Centre, CEMV, BOSCH Automobile Training centre, UTLP Centre for Embedded Systems, IBM Centre for Excellence, WIPRO Mission 10X Learning Centre, LEMA Labs and Think Lab are made available to all the students and faculty members. Further students pursuing final year inter disciplinary projects are encouraged to make use of these facilities to the full extent. So that, all the equipment are utilized optimally.

S.No.	Faculty	Institution	Facility Used	Utilization
1	Venkat kuamr	Madras Institute of Technology, Anna University, Chennai	Machine Vision, Centre for Excellence in Machine Vision	To obtain Multi View shapes from focus
2	Sageer	Madras Institute of Technology, Anna University, Chennai	Machine Vision, Centre for Excellence in Machine Vision	To study stereo vision scheme reconstruction
3	Prithviraj	Rajalakshmi Institute of Technology, Chennai.	Machine Vision, Centre for Excellence in Machine Vision	To study Wrap Vz properties
4	Shanmugam	Madras University	Electrochemical workstation, Chemistry Wet Lab	To study properties and reactions with electrodes
5	D.Nathan	St. Joseph Institute of Technology, Chennai	Machine Vision, Centre for Excellence in Machine Vision	To obtain image patterns

**Has the institution received any special grants or finances from the industry or other beneficiary agency for developing research facility? If 'yes' give details.**

- **TIFAC CORE:** TIFAC CORE on MACHINE VISION was established in the year February 2009 sponsored by the Department of Science & Technology , the Government of India, for an outlay 5.15 crores
- **IBM Centre of excellence:** A joint lab facility with IBM was established in the year 2011.
- **Think Labs:** Lab facility in Embedded systems was created in 2012 and the training programs are conducted by the IITB, Mumbai alumni, Funding : 2.50 lakhs
- **UTLP :** Lab facility in Embedded systems was created in 2013 by WIPRO for an outlay of Rs.15 lakhs
- **Robotics Lab:** Robotics Lab was established in 2010 to train the students and the faculty in the field of advancement in Robotics and the training programs are conducted by LEMA LABS of IITM, Madras.
- **REC-Bosch Certification Centre:** The College has signed an MoU with BOSCH in 2012 to conduct Joint certification program, funding: Rs.70 lakhs.
- **MODROBS:** The lab facilities in the Department of Mechanical Engineering and Electronics and Communication Engineering were modernized with an AICTE funding Rs. 5.15 lakhs and Rs.14 lakhs respectively
- **RPS:** Dr.L.Sujatha, Professor (ECE), Dr.B.Venkatachalapathy, Professor (Chemistry) and Dr. R. Geetharamani, Professor & HoD (CSE) have been sanctioned Rs.9.5 lakhs, Rs.8 lakhs and Rs 7.0 lakhs respectively by AICTE for their projects under the Research promotion Scheme.
- **NATIONAL MEMS DESIGN CENTER AT REC-A** National MEMS Design Centre (NMDC) at our institute has been established under National Program on Micro and Smart Systems (NPMASS) for the benefit of users from the region. REC motivates the research activity in the field of MEMS by proper utilization of the facilities provided by NPMASS from design to fabrication of prototype MEMS products and specific field applications. REC also facilitates external researchers from other interested institutes (academic or National Labs subject to individual software licensing conditions) to use the design tools.
- **Micro Fabrication Laboratory-** Micro Fabrication Laboratory was established at a cost of 1.17lakhs has facilities for fabrication of micro devices. This lab has a photo resist spinner, mask aligner, curing ovens, hot plate with stirrer in a yellow-room environment for photolithography. The light other than yellow will cause chemical reactions in the photo resist and alter the micro pattern. Since the photo resist chemical is not sensitive to yellow light, it is essential to maintain the yellow light ambiance.
- **Clean Room:** A state of the art 'clean room' is also being created with Class 1000 and 10,000 specifications at a cost of 45 lakhs in the college, enhancing semi conductor fabrication and embossing techniques.

**3.2.6 Enumerate the support provided to the faculty in securing research funds from various funding agencies, industry and other organisations. Provide details of ongoing and completed projects and grants received during the last four years.**

With great thrust on creating and sustaining research culture among the stakeholders in the campus, the College provides all the possible support, systems and encouragement. With special focus on Research and innovation, RCAB was established to promote research.

**Details of supports extended are the following:**

- Seed money is provided for project proposals submitted by the department to carry out initial research.
- RCAB motivates and helps the faculty in preparing the research proposals and on their behalf interacts with research agencies like DRDO, UGC, AICTE, ICMR etc.,
- RCAB helps the Principal Investigators of the ongoing projects to interact with experts from other academic institutes and industries in the concerned fields, facilitates bilateral visits and discussions with national and international researchers, recommends the faculty for training and attending workshops and conferences in the emerging areas in which project proposals are to be submitted and extends administrative support for filling up the application, procuring and servicing of equipment and preparing UC for the funds received.

**Details of funds received in the last 5 years**

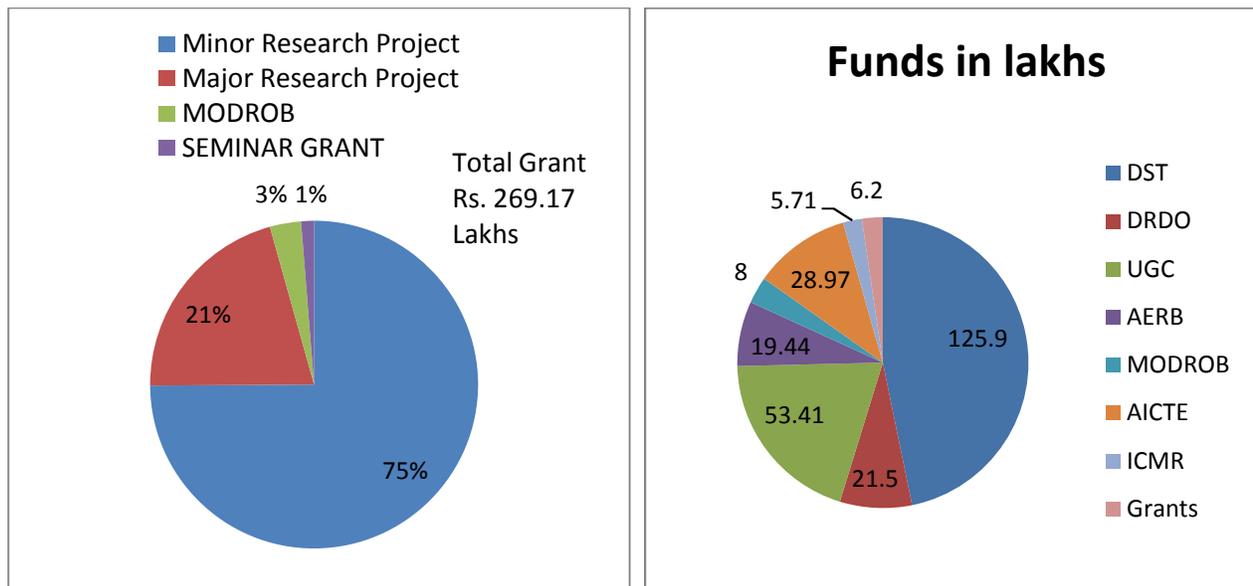
Nature of the Project	Duration in Yrs	Title of the project	Name of the funding agency	Total grant (Rupees in lakhs)	
				Sanctioned	Received
Major Projects	3	Characteristics of Geopolymer Aerated Concrete using Mineral Admixtures	DST-SERB	20.94	17.47
	4	Establishment of TIFAC CORE on Machine Vision	DST-TIFAC	515 [outlay]	Full share of (120lakh) from DST-TIFAC CORE
	2	Fabrication of Polymer micromoulds for MEMS Biosensors using soft Lithography	DRDO	21.686	21.50
	3	Elucidation of Mechanism by which propylthiouracil clears Lesions in Psoriatic Patients	DST, SERB	17.62	14.75
	3	Fabrication of Nano oxide based sensor on stabilized nano Zirconia for detection of H <sub>2</sub> S	AERB	24.00	19.44
	2	Interactive Teaching Aid for Autistic Children (ITAAC)	DST, SEED	38.30	18.95
	3	Identification of toxicity	AICTE-	18.90	17.76

		mechanism through the relationship between exposure and changes in Genome-Wide gene expression pattern by using bioinformatics tools	RPS		
	3	Development of plant based gold nanoparticles with special reference to high - fructose diet induced insulin resistance	AICTE-RPS	7.76	6.98
	3	Efficient Prediction and Monitoring Tool for Diabetes Patient using Data Mining and Smart Phone System	AICTE-RPS	4.70	4.23
	3	Fabrication of Low Cost MEMS Micro fluidic devices using Metal embossing technology on glass for lab on chip applications	DST-TSDP	124.56	74.77
	2	Thermography as a tool to detect fetal abnormalities	ICMR	11.52	5.71
Seminar Grant		Application of Nanotechnology in Composite Materials And structure	AICTE	1.00	1.00
		Automotive Electronics and Electronic Engine Management	AICTE	1.50	1.50
		National Conference on Refrigeration Airconditioning (NCRAC 2015)	DST-SERB	0.75	0.75
		Faculty Development Program on “Logistics and Supply chain management”	AICTE	6.00	3.00
		Big Data Analysis -10 day training programme Division	DST	6.00	-
MODROB		Green Communication - A Low Power Implementation of MIMO-OFDM System for EMI mitigation	AICTE	8.00	8.00
	2	Functionally graded hydroxyapatite/tricalcium phosphate coatings on Ti by Electrophoretic Deposition for biomedical applications	UGC	2.55	1.825
		Green Synthesis of Nobel metal nano Particles (Pt and Pd) and their biomedical applications	UGC	3.35	2.875
		Photocatalytic and Electro catalytic properties of Metal doped Zinc oxide Nanomaterials	UGC	3.05	2.55
		Development of Novel Bioactive Nano Zirconia Coatings on	UGC	2.55	1.825

UGC Minor Projects	2	Medical Grade 316L SS for Dental Implant Applications			
		Preparation of 3D scaffolds by synthesis of aligned and nonaligned nano bioceramic containing nanofibers by electrospinning	UGC	3.00	2.315
		Chitosan Collagen Polyvinyl Alcohol Polymer Composite Nanofibers : Characterization, Antimicrobial Studies and its Wound Healing Effects	UGC	2.85	1.425
		Bioflocculation And Biosurfactant Activity of <i>Nostoc</i> Cyanobacteria	UGC	1.90	0.95
		Antibacterial and Antiviral activity of Marine Actinomycetes on Multidrug Resistant Luminescent Bacteria And Yellow Head Virus (YHV) Affecting Giant Tiger Prawn ( <i>Penaeus Monodon</i> )	UGC	3.00	2.25
		Elucidation of Mechanism of Action of Withaferin A Present In Ashwagandha Using Serial Molecular Docking Method And Pharmacophore Modeling	UGC	1.10	0.975
		Design and Development of Powered Lower Limb Exoskeleton for Hemiplegic Patients	UGC	3.00	2.75
		Development of automated tool for early diagnosis of Diabetic Retinopathy From SDOCT retinal images using virtual instrumentation	UGC	2.00	1.45
		Development of a device to detect Obstructive Sleep Apnea (OSA) during wakefulness using breathing sounds	UGC	3.70	3.40
		Industrial Case Study Analysis for Job Shop Scheduling And Its Integration With Production Resource Planning	UGC	1.00	0.575
		Vibration Analysis Of Nano Clay Filled Natural Fiber Composites	UGC	5.00	4.87
		Surface Modified Roller Burnishing Of Al-SiC composites	UGC	4.85	4.70
Fabrication of an EIS Biosensor for Detection of Uric Acid Level in Human Body	UGC	4.10	2.85		

	Enhancement of radiation characteristics of antenna using meta material for mobile application	UGC	4.10	3.25
	Study of supersonic jet characteristics	UGC	4.75	4.475
	Acoustic measurement of High speed jets	UGC	4.60	4.20
	Application of Magneto Rheological fluid damper for use in Automotive suspension.	UGC	4.60	3.575
	An Optimized workflow scheduling for E-Learning in Cloud Computing	UGC	0.40	0.37

**Sponsored R &D Activities during 2014-15**



Pie-chart represent funds received from various funding agencies under research projects

**3.3 Research Facilities**

**3.3.1, 3.3.2, 3.3.3 and 3.3.6**

What are the research facilities available to the students and research scholars within the campus?

What are the institutional strategies for planning, upgrading and creating infrastructural facilities to meet the needs of researchers especially in the new and emerging areas of research?

**Has the institution received any special grants or finances from the industry or other beneficiary agency for developing research facilities? If 'yes', what are the instruments/ facilities created during the last four years**

**What are the collaborative research facilities developed / created by the research institutes in the college? For ex. Laboratories, library, instruments, computers, new technology etc.**

Apart from the curriculum requirement the college as developed over the years several research facilities for doing cutting edge research development activities in various fields. Some of the major facilities created and made available for students, research scholars and faculty members are as detailed below:

S.No	Research Labs	Supported by	Facilities
1	MEMS design centre	National Program on Micro and Smart Systems (NPMASS)	Facilities such as MEMS CAD Tools, COMSOL 4.1, Tanner EDA tools which covers design to fabrication of prototype MEMS products and specific field applications.
2	Centre for Excellence in Machine Vision (CEMV)	Department of Science & Technology, Government of India	Machine Vision Tools and softwares
3	Think Labs	IIT B	Remote Center for conducting Spoken Tutorials, workshops and certifications by IIT, BOMBAY in collaboration with ISTE and funded by MHRD
4	Unified Technology Learning Platform Centre	WIPRO Mission 10X	UTLP Kits to enhance project based learning.
5	BOSCH Training labs	Robert Bosch	Training is given to the Students in the modules such as Fuel Injection Pumps Automotive Electricals Vehicle Air-conditioning
6	Supercomputing facility	Tata Consultancy Services	6000 node hours of their supercomputing and computer cluster facilities
7	Engine Testing Lab	AICTE	Engine performance, Engine emission study
8	Clean Room Facility	REC	Manufacturing, Pharmaceuticals, Biotech, Medical device
9	Plant Tissue Culture lab	ABAN	Study of phytochemical from plants and algae

### Methodologies followed for planning and creating above facilities include

- Budgeting for the next ten years towards research
- Upgrading the existing facilities
- Collaborating with industries for research
- The institute promotes scientific temper and research culture among the faculty and students through RCAB which takes the following efforts:
  - Harnessing talents among the faculty members
  - Identifying emerging areas and possible funding agencies
  - Enabling faculty members to conduct basic research in the specific areas with seed money provided by the institute prepare detailed project proposal and get funding from specific agencies.

Agencies sanction for equipment components as a part of the research grant. Equipments which are mentioned as a part of proposal submitted are purchased from quality manufacturer or supplier. Equipments such as Optical microscope, sputtering Unit, Oxidation furnace, Thermo compression system are purchased under various research projects and installed for research use.

### Details of Major Equipment Purchased for R& D in the last 4 years

S.No	Date of purchase	Details of the equipment	cost
1	22.12.2011	B2902A – LX1 Compliant 2ch precision source /Measure unit	Rs :526500 /-
2	22.12.2011	Opt 34972A -20ch scanning mux	Rs: 140810 / -
3	22.12.2011	4263B – LCR METER	Rs: 208069 /-
4	14.12.2011	Rotavapor Evaporator	Rs : 151200 /-
5	09.02.2011	Agilent -Flouresence Spectroflourimeter	Rs : 678150 /-
6	07.12.2013	Electrochemical workstation with potentiostat / Gaivanostate & Electro chemical Impedence spectroscopy	Rs : 775000 /-
7	22.05.2014	Programmable spin coating system.	Rs. 94,463/-
8	26.05.2014	Ultrasonic cleaner model TPC-40H2	Rs. 50,000
9	07.10.2014	HOT AIR OVEN (3 No's)	Rs. 42800/-
10	26.06.2014	LEICA DM 2700M MICROSCOPE	Rs. 8,57,191/-
11	08.12.2014	FUME CUPBOARD – KOT (2 No's)	Rs. 152,000/-

12	06.05.2015	Electroplating plant	Rs. 171750/-
13	15.05.2015	MUFFLE FURNACE	Rs : 50494/-
14	15.05.2015	LAPTOP, HP Probook 430 Gz laptop	Rs: 72187/-
15	29.05.2015	Electro spinning Unit	Rs: 2,01,000/-
16	30.06.2015	LAPTOP (IS1325 (2 Part 1) 2010 R-41001813	Rs : 63999 /-
17	09.07.2015	Single Disk Polishing Machine	Rs. 56778/-
18	27.07.2015	Refrigerated Centrifuge	Rs : 178,416/-
19	06.08.2015	Dry flim laminator	Rs : 1,35,035/-
20	02.09.2015	DC. Regulated Power Supply Make : K – pas	Rs : 70,140/-
21	10.09.2015	Solid works professional with (Software)	Rs: 4,16,500/-
22	23.09.2015	Accelerometer.	Rs : 4,00,000/-
23	04.11.2015	ULTRA INSTRUMENTS, C-Mag HP10 Magnetic stirrer	Rs: 57,147/-
24	22.07.2015	3GHz RF generator and detector	Rs: 230,625/-
25	14.12.2015	C. Mag HP-10 Hotplate	Rs : 57,147/-
26	07.07.2015	Thermo Compression Unit	Rs. 4160731/-
27	30.06.2015	Sputtering Unit	Rs. 2146880/-
28	29.12.2015	Multi Port Pressure scanner	Rs : 3,19,883/-
29	15.01.2016	Damper Assy, short strike	Rs : 105000/-

### 3.3.4 What are the research facilities made available to the students and research scholars outside the campus / other research laboratories?

- Based on the MoUs signed with the industry and research institutes both nationally and internationally, students have a chance to interact with researchers from premier Institutes and universities to take up joint collaborative projects.
- As the college is situated in Chennai and the faculty have research collaborations with leading institutions, students have access to cutting edge technology and research facilities.

- The college and faculty are members of professional bodies and also hold several responsible positions at the national and international levels. This gives us better opportunities to interact and participate with reputed scientists and academicians from across the globe.
- Some of the Research facilities available for the faculty and students are
  - The Indian Institute of Technology Madras
  - Central Leather Research Institute, Structural Engineering Research Centre
  - National Metallurgical Laboratory
  - Central Electrochemical Research Institute
  - Research labs at Anna University
  - Research labs Madras University
  - Research labs at CFTRI
  - Research labs at MSSRF
- Activities of students' chapters of several professional bodies like ACM, CSI, IEEE, ASME, IET, IETE, ISTE, SBC, ICI enable the students to interact with professionals from the industry and academia to undertake in-plant training and projects at state of the art facilities of the industries and research institutes.

### 3.3.5 Provide details on the library/ information resource centre or any other facilities available specifically for the researchers?

The college has subscribed to the e-journal packages. The packages cover journals with multiple accesses and download facility for all faculty, students, researchers and staff members. Considering the importance given for R&D in our campus, all faculty and staff members utilize this facility to come out with constructive outputs in terms of publication, funded projects, consultancy and innovative products and solutions. Faculty members have been provided with login facility. The list of journals offered by each publisher is attached for ready reference.

S.No	Name of the E-Journal	Web Sites
1	IEEE	<a href="http://ieeexplore.org">http://ieeexplore.org</a>
2	Springer- EEE,CSE	<a href="http://www.springerlink.com">http://www.springerlink.com</a>
3	Springer- Mechanical Engineering	<a href="http://www.springerlink.com">http://www.springerlink.com</a>
4	ASCE – American Society of Civil Engineers	<a href="http://ascelibrary.org">http://ascelibrary.org</a>
5	Elsevier (Science Direct)- Engineering +Computer Science	<a href="http://www.sciencedirect.com">http://www.sciencedirect.com</a>
6	Elsevier (Science Direct)- Biotechnology (Back File)	<a href="http://www.sciencedirect.com">http://www.sciencedirect.com</a>

7	Nature –Biotechnology	<a href="http://www.nature.com/libraries">http://www.nature.com/libraries</a>
8	Scientific American – Biotechnology	<a href="http://www.nature.com/libraries">http://www.nature.com/libraries</a>
9	ASTM Standards	<a href="http://enterprise.astm.org">http://enterprise.astm.org</a>
10	McGraw Hill – Access Engineering	<a href="http://2.accessengineeringlibrary.com">http://2.accessengineeringlibrary.com</a>
11	J-GATE- Engineering & Technology	<a href="http://www.jgate.in">http://www.jgate.in</a>
12	J-GATE- Management Sciences	<a href="http://www.jgate.in">http://www.jgate.in</a>
13	EBSCO–Business Source Elite	<a href="http://search.ebscohost.com/">http://search.ebscohost.com/</a>

The college is one of the NPTEL study centers and a remote centre for various faculty development programmes conducted by IITB and IIT, Kharagpur under ekalavya e-outreach programme. More than 20 programmes have been conducted by the various departments.

### 3.4. Research Publications and Awards

#### 3.4.1 Highlight the major research achievements of the staff and students in terms of Patents obtained and filed (process and product) Original research contributing to product improvement Research studies or surveys benefiting the community or improving the services

##### Research inputs contributing to new initiatives and social developments

##### Patents obtained and filed so far

S.No.	Title	Name of the Inventor	Dept.	Patent Application Number
<b>Patents filed 2010-2012</b>				
1	Leakage Power Recovery Scheme in Single Phase Induction Motor”	Mr. A. Selvaraj Mr. Shaik Mohammed Abrar Ms. S.P. Poornima	EEE	2297/CHE/2010 Dated: 11.08.2010
2	Jal Suddhi’ a product invented to improve the water quality	Dr.N.Parthasarathy	BT	4430/CHE/2011 Dt 19/12/2011
3	Modified Energy Efficient Exhaust fan	Dr. A. Selvaraj Mr. P. Venkataraman	EEE	738/CHE/2012 DATED: 28-02-2012
<b>Patents filed 2013-2014</b>				
4	Cloud storage and retrieval of Information using USSD in phones	Mr.Tejas Naren.T.N Mr.Sanjeevi.L.R Mr.Shankar Siddharth.K.A	CSE	4247/CHE/2013 Dt.20.09.2013
5	Painless intra muscular Nozzle Gun	Mr.Jaikanth.M.C Mr.Jaivignesh	MECH	4527/CHE/2013 Dt.07.10.2013

6	Mobile based Emergency alert System	Mr.Sanjeevi.L.R Mr.Tejas Naren.T.N Mr.Shankar Siddharth.K.A	CSE	4599/CHE/2013 Dt.10.10.2013
7	Hand Held Air Gun	Dr. S.P.Srinivasan Mr.Jaikanth.M. Mr.C Jaivignesh	MECH	5399/CHE/2013 Dt.22.11.2013
8	Inspection of Plunger for Automotive Braking System	Prof. N.Radakrishnan Mr.Shankar Bharathi. S Mr.B. Sasikumar	IT & MECH	5516/CHE/2013 Dt. 29.11.2013
9	Portable mobile charger with reverse polarity protection	Dr.T.M.Sridhar Mr.Sriram Ganesh Mr.Sai Siddarth P	EEE & Chem	5517/CHE/2013 Dt. 29.11.2013
10	Remote control for safe use of domestic gas cylinders	Mr.A.Selvaraj Dr.B.Venkatachalapthy Mr.Sai Siddarth P Mr.Sriram Ganesh	EEE & Chem	5515/CHE/2013 Dt. 29.11.2013
11	Biopesticide from Watermelon seed extract against stored food grain insects	Dr. Johanna Rajkumar Dr.V.Gayathri	BT	4991/CHE/2013 Dt.06.11.2013
12	Insecticide isolated from Cowpea ( <i>Vigna unguiculata</i> ) against ants	Dr.V.Gayathri Dr.Johanna Rajkumar	BT	4992/CHE/2013 Dt.06.11.2013
13	'Lactal' a product invented to treat Tannery effluent	Dr. Jayasree	BT	4993/CHE/2013 Dt.06.11.2013
14	The feasibility study of designed three phase (Solid-Liquid-Gas) invertase fluidized bed biofilm react	Ms.S.Sabarunisha Begum	BT	4994/CHE/2013 Dt.06.11.2013
15	Application of <i>Musa Sapientum</i> extract in food preservation	Ms.L.Sowmya	BT	4996/CHE/2013 Dt.06.11.2013
16	Extraction of Anthocyanin from <i>Delonix regia</i>	Ms.L.Sowmya	BT	4997/CHE/2013 Dt.06.11.2013
17	Optimum design for non-solenoidal operation of light commercial vehicle starter motor	Mr.J. Jakith Deva Priyan, Mr.Deeban Babu, N. Mr.Karyhikeyan, A. Selvaraj	EEE	2006/CHE/2014 Dt. 17.04.2014
18	Voltic glove self-protection glove with insulations and conductors to provide electric shock to the criminals	Mr.J. Jakith Deva Priyan.	EEE	2269/CHE/2014 Dt. 06.05.2014

### Original research contributing for product development –

MEMS Design Centre and Centre for Excellence in Machine Vision (CEMV) has developed new products and processes which are the outcome of original research work carried out in these centres

S.No	Product	Developed by	Use
1	Triaxial Accelerometer	MEMS Design Centre	Simultaneous measurements in three orthogonal directions
2	Micro Tweezer		Tweezers with small, pointed tip used for manipulating tiny objects
3	MEMS Gyroscope		Measurement of Angular velocity
4	Machine Vision Inspection System for Spline Gear	CEMV	Inspects gear profile and operation missing
5	Machine Vision Break Piston Cylinder Inspection System		Inspects burr in the holes, double punch, hole offset, hole position and hole missing of break piston cylinder
6	Automatic Rubber gasket Inspection Machine		Inspects rubber hole diameter and surface defects in rubber
7	Automatic Visual inspection system for 3G Modem		Detects presence and absence of screws, fans and cables in 3G Modem.

#### Research studies or surveys benefiting the community or improving the services

- Research project “Interactive Teaching Aid for Autistic Children” sponsored by SEED-DST aims to create an interactive teaching aid for the children affected by autism. Outcome of this project will directly impact the children affected by autism as the curriculum is in tune with International standards and it is being developed to suit different IQ levels such children.
- Research project “Bioflocculation and Biosurfactant activity of Nostoc Cyanobacteria” funded by UGC-MRP, deals with cleansing of pollutants and it is expected to impact environmental cleansing technology through bio-remediation process.
- The students are engaged in the survey of people suffering from diabetes in the low income group and they have tried to insist on the consumption of millets instead of rice and wheat.
- Most of the community services rendered by Rotaract and ENACTUS group of students involve surveys and research on the projects they have undertaken. For eg: A survey was carried out by ENACTUS REC to assess the cause for the failure of the domestic garbage segregation scheme initiated by Chennai Corporation, Exnora and ITC in different colonies of Mogappair, Chennai.
- The finding of this survey was found to be lack of awareness, lack of direct involvement of the public, insufficient utilities or equipments, irregular timing of the garbage collectors, lack of man power, public apathy and laziness. Considering these drawbacks they designed an efficient proposal with a multifold objective of identification of target population, creating awareness campaigns on solid waste management and provision of educational skills to the target population.

**3.4.2 Does the Institute publish or partner in publication of research journal(s)? If ‘yes’, indicate the composition of the editorial board, publication policies and whether such publication is listed in any international database?**

Yes. The institute publishes an International Journal on “Global Business Management and Research” (ISSN 2278 8425).

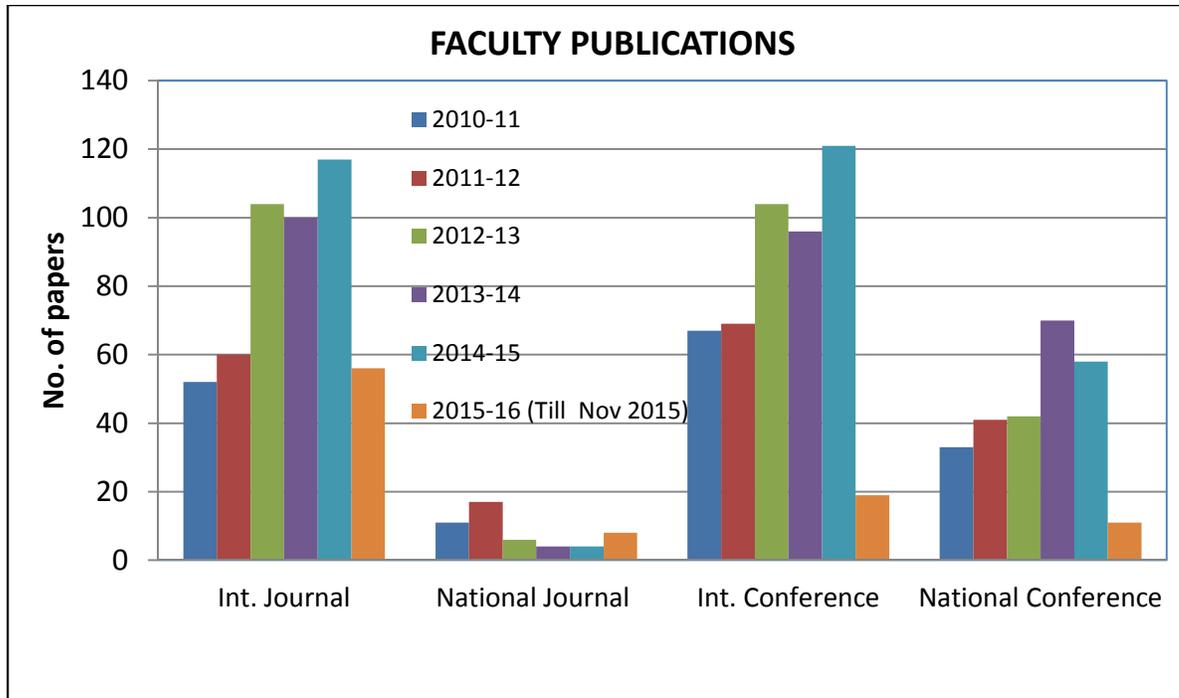
The editorial board consists of

Editor in Chief	: Prof.S.Sankar, Management Studies, REC.
Editor	: Dr. K.R.Sowmya, Professor, Management Studies,REC.
Associate Editor	: Ms.R.Sindhu, Assistant Professor(SG), Management Studies, REC
Advisory Board	:
Dr.Aiste Urboniene Vilnius University, Kaunas, Lithuania	Dr.K.Ramesh Linton University, Malaysia.
Dr.Babs Surujlal Vaal University of Technology, South Africa	Dr.T.C.Thomas, Associate Professor, Management Studies, REC
Dr.Kumaran Subramanian University of Malaya, Malaysia.	Dr.C.B.Ragothaman, Professor, Management Studies, REC
Dr.N.Panchanatham Annamalai University, Chidambaram	Dr.G.Sankararaman, Professor, Management Studies, REC

The original research papers related to HR management, trade, international business, finance, corporate governance, business laws, statistical inference, total quality management, cost accounting, crisis management, insurance risk management, consumer behavior etc are published. The department has a firm commitment to maintain very high standard in the publications. The manuscript is accepted only if it is in accordance with the guidelines provided and rigorous review procedures have been proposed to be adopted. The response right from the very first issue has been encouraging. From the quality of publication to the articles to the paper, rigorous quality standards have been followed.

**3.4.3 Give details of publications by the faculty and students:**

REC is committed to the promotion of research and innovation and in this direction has put systems and procedures in place to continuously motivate the faculty and students to pursue research work. As a result of the persistent and concerted efforts, the following publications have been made possible.



**3.4.4 Provide details (if any) of research awards received by the faculty recognition received by the faculty from reputed professional bodies and agencies, nationally and internationally**

M.Venkatraman, Final year CSE for the academic year 2013-14 and Jaidev, Final year Bio-Tech for the year 2014-15, have bagged the TCS Best Outgoing Student Awards. Our students of previous batches have also been honoured with TCS Best Project.

Following is the table which depicts various awards and recognitions awarded to our faculty in recognition to various contribution:

S.No	Title	Description
1	Department	National MEMS Design Center, REC
	Name of the award	Participation in Community Chip Fabrication Program, NPMASS, Govt. of India
	Awarded by	Prof. Aatre, Chairman, NPMASS Program
	Awarded on	13.01.2015
	Awarded for	The Participation in the community chip fabrication program
2	Faculty	Dr. Natteri M. Sudharsan , Mechanical
	Name of the award	Nanyang Alumni Service Award
	Awarded by	Nanyang Technological University- Singapore
	Awarded on	2014
	Awarded for	Outstanding Contribution to NTU-Alumni association –India

3	Faculty	Dr. Natteri M. Sudharsan , Mechanical
	Recognition	Recognised as the Fellow of American Society for Mechanical Engineers (ASME)
	Significance	He is 1 of the 14 Indians and ONE amongst the 3500 in the world till date who have been bestowed with this honor. He is the only Faculty member from a self Financing College in India to achieve this honor.
4	Faculty	S.Baghavathi Priya., IT
	Name of the award	Active participation award – Woman member
	Awarded by	Computer Society of India, 12.12.14
5	Faculty	Dr.S.Poonkuzhali, IT
	Name of the award	Certificate of Merit for The 2012 IAENG International Conference on Data Mining and Applications
	Awarded by	International MultiConference of Engineers and Computer Scientists 2012 -Hong Kong.
	Awarded on	14-16 March, 2012.
	Awarded for	Relevance Ranking and Evaluation of Search Results through Web Content Mining
6	Faculty	Dr.S.Poonkuzhali, IT
	Name of the award	Best Paper Award
	Awarded by	Recent trends in Networking Technologies organized by IGCAR & LISPS, Kalpakkam.
	Awarded on	21 <sup>st</sup> to 23 <sup>rd</sup> Dec. 2012
	Awarded for	the paper entitled “ Security threats involved in PAN card registration process using web service
7	Faculty	Dr.S.Poonkuzhali, IT
	Name of the award	International Paper Presenter Award
	Awarded by	Computer Society of India-49 <sup>th</sup> National Annual Convention at Vizhakupattanam
	Awarded on	Dec-13
	Awarded for	Papers presentation at International level
8	Faculty	Dr. K.R Sowmya, MBA
	Name of the award	Fellowship of the World Business Institute of Australia
	Awarded by	World Business Institute of Australia
	Awarded on	1.3.2015
	Awarded for	Excellence in academic research activities
9	Faculty	Automobile Department
	Name of the award	The Teaching awards in engineering
	Awarded by	Education Matters and Staffordshire University UK
	Awarded on	03.03.2014
	Awarded for	Scoring University ranks in Anna University examinations

10	Faculty	Dr. K. Bhaskar, Automobile
	Recognition	Inclusion of Bio data in Who's who in the World 2015 (32 <sup>nd</sup> edition) Marquis Who's Who, USA , August 2014 for Research publications
11	Name of the Faculty	R.Babu, IT
	Name of the award	Active Participation Award- Young Member
	Awarded by	Computer Society of India
	Awarded on	13th December, 2014
12	Name of the Faculty	Dr. S. Mohamed Yacin, Biomedical Engineering
	Name of the award	Travel Grant Award to USA
	Awarded by	UGC
	Awarded on	October 7-10, 2015
13	Name of the Faculty	Dr.S.Poonkuzhali
	Name of the award	Best paper award for “Applying classifier algorithm to organizational memory to build an attribution predictor model”
	Awarded by	9th International Conference on Computer Engineering and Applications (CEA '15), Dubai,UAE
	Awarded on	22-24 Feb 15

### 3.5 Consultancy

#### 3.5.1 Give details on the systems and strategies for establishing institute-industry interface?

Sl.No.	Who initiates	Nature of interaction	When it is initiated
1	Training and Placement Cell	<ul style="list-style-type: none"> <li>For arranging Value Added Programs by Industry experts</li> <li>Students Placement</li> </ul>	Throughout the year
2	Heads of the Departments	<ul style="list-style-type: none"> <li>Industrial Visits</li> <li>Guest lectures and Industrial training by industry experts</li> </ul>	During the beginning of the semester
		<ul style="list-style-type: none"> <li>Sabbatical training for teachers</li> </ul>	During vacation period
3	Research and consultancy Advisory Board	Consultancy activities	Throughout the year
4	Students (in consultation with HODs and Training and Placement)	Inplant Training and Internship	During vacation period

The Training and Placement Cell ensures that the institution maintains symbiotic relationship with multiple industries across diverse segments. Meetings with the industry personnel result in signing of MoUs and accreditation by the industries and training and consultancy services. Faculty members also establish industry institute relationship during industrial visits and internship training programmes.

### 3.5.2 What is the stated policy of the institute to promote consultancy? How is the available expertise advocated and publicized?

**The Stated policy of the institution regarding the promotion of consultancy gives space for the following:**

- Based on the available faculty expertise, relevant industries are identified in consultation with Research and Consultancy Advisory Board and visits and discussions are initiated. Problems in design, manufacturing or testing faced by the industries and further improvements envisaged by them are taken up as consultancy work. The Training and Placement Cell also enables faculty to develop contact with industries and promote consultancy activities.
- College Development Council and Governing Council have eminent industrialists who also give appropriate suggestions for matching the faculty expertise and needs of industries.
- Accreditation of the college by the industries and signing of MoUs also promote consultancy activities.
- The institution is an active member in CII which also helps in connecting the institution with various industries.

The institute has signed an MoU with National Research Development Corporation for the marketing of products and processes developed by REC. This MoU enables the industries and society to get the benefit of innovations taking place at REC.

The expertise of the eminent faculty is also made known through the college website, college prospectus and brochures and through personal contacts of the experts.

### 3.5.3 How does the institution encourage the staff to utilize their expertise and available facilities for consultancy services?

The RCAB does the following:

- Enables the capable faculty to interact with the industries.
- Keeps the dialogue going on the needs of the industry in terms of improving their products and processes.
- Brings out brochures showing the consultancy work carried out and circulates them to various industries to bring an awareness of the expertise and facilities available in the Tifac Core, MEMS Centre and departments.

Certain weightage is given for involvement in consultancy work in the quarterly assessment of the performance of the departments and the departments are ranked based on total score and top three are listed as per the rank as star departments in the quarterly Newsletter. Thus evaluated on an annual basis, the department with highest score is given an award on the College Day function.

### 3.5.4 List the broad areas and major consultancy services provided by the institution and the revenue generated during the last four years

The institution's forte has been maintaining successful partnership with the industries. The nature and broad areas of consultancy involves knowledge management, preparation of biomaterials, effluent treatment, clinical research, testing of materials to name a few.

#### Department of Biotechnology

S.No.	Name of the Industry	Details of Consultancy offered	Revenue Generated
1.	Visoka Engineering Private Limited, Sriperumbudur	Developing a Cleaning Chemical	Rs. 10,000/-
2.	CARE And CURE Pvt. Ltd.Chennai	Studies on the Efficacy of Ambrex Based Herbal Formulations are Being Carried Out For Various Conditions Like Hyperlipidemia, Myocardial Infarction and Hepato Protective Action in Drug Induced Toxicity	Rs. 2,21,000

#### Department of Information Technology

S. No.	Name of the Industry	Details of Consultancy offered	Revenue Generated
1.	Plant2PC Engineering Solutions pvt ltd for Brakes India.	MV inspection of forged brake component	3,98,207.00

**Centre for Excellence in Machine Vision (CEMV)**

S. No.	Name of the Industry	Details of Consultancy offered	Revenue Generated
1	Consultancy work on Electronic Social Network for Employees of MANDO INDIA.	Mando India Limited,SIPCOT Industrial Park, Irungattukottai, Tamil Nadu- 602 117	20,000
2	Royal Enfiled	Tappet Door Inspection	7,95,000.00
3	Citizen Press components	Oil Seal Inspection	2,98,000.00
4	Jain Rubbers Pvt ltd	Rubber Gasket inspection	7,80,000.00
5	Super Auto Forge Pvt Ltd.	Surface inspection of Brake Piston cylinder	7,95,000.00

**Department of Mechanical Engineering**

S. No.	Name of the Industry	Details of Consultancy offered	Revenue Generated
1.	Saint Gobain Glass India Ltd	Rupture and Modulus of Elasticity of the 20 wooden samples dt. 16.12.2013	10,000
2.	Saint Gobain Glass India Ltd	114 wooden samples tested for research facilities dt. 10.06.2014	41,040
3.	Namakkal Transport Carriers	Design validation of the load carrying capacity of multi axle trailer for heavy transport vehicles Aug 2010-Apr 2011	2.5Lakhs

**Department of Automobile Engineering**

S. No.	Name of the Industry	Details of Consultancy offered	Revenue Generated
1.	Iljin Automotive India Ltd.,	Detection of Teeth count and improper model identification in the flywheel assembly	Rs.90,000/-
2.	Super Auto forge Pvt ltd	Detection of Hole offset in the Brake piston cylinder	Rs.39,000/-

### 3.5.5 What is the policy of the institute in sharing the income generated through consultancy (staff involved: Institution) and its use for institutional development?

There is a provision for part of the revenue generated to be given to the faculty involved and certain a portion for development of the process/facility. The amount to be given to faculty as a part depends upon the nature of the project, cost and expenses incurred during developing solutions and so on. Generally the cost and expense part works out to 40- 60% of the revenue and faculty is given with 30 – 40% of the revenue generated

## Extension Activities and Institutional Social Responsibility (ISR)

### 3.6.1 and 3.6.2

**How does the institution promote institution-neighborhood-community network and student engagement, contributing to good citizenship, service orientation and holistic development of students?**

**What is the Institutional mechanism to track students' involvement in various social movements / activities which promote citizenship roles?**

As very well stated in the Mission and Vision declaration of the institution, imparting human values to the students and providing ethical professionals with concern for the society are emphasized during the program of study. Accordingly, the following Centre/Forum/Clubs have been formed and students take active part in the activities and imbibe social responsibility, acquire team spirit and leadership qualities so that, they serve the society and the nation for instance, during the recent Chennai deluge REC students, unmindful of their own safety, extended helping hand to all those immersed in flood waters

### REC-ROTARACT IN FLOOD RELIEF OPERATIONS



### Center for fostering Social Responsibility

The college has established this dedicated Center for fostering Social Responsibility headed by Dr. C. B. Ragothaman, HoD, MBA. This center acts as an umbrella for coordinating holistic development of students with societal attitude and concern. Training is given by the students to self-help groups comprising mainly of underprivileged women and to school children in the neighborhood. Special coaching in computers, mathematics, and communication skills in English are also given.

## ENACTUS Club

This club has organised through student teams

- Special programmes for training Automobile Mechanics.
- Awareness creation program on use of millets to prevent diabetes in rural and slum population.
- Visiting orphanages and have launching T-Shirt projects where the money earned as profit in selling the T-shirts are given to the other needy orphanages.
- Solid waste management programmes in various places in Chennai for a better and cleaner tomorrow.

For example, the activities of the ENACTUS Club of REC for the year 2014-15 is given as follows:

Sl No	Date	Event
1	15 <sup>th</sup> August, 2014	Lake cleaning
2	23 <sup>rd</sup> August, 2014	Beach cleaning
3	5 <sup>th</sup> September, 2014	Initiation day
4	15 <sup>th</sup> October, 2014	Rice bucket challenge
5	20 <sup>th</sup> November, 2014	World environment day
6	11 <sup>th</sup> November, 2014	Clean India green India
7	14 <sup>th</sup> February, 2015	Old age home - valentines day
8	1 <sup>st</sup> March, 2015	Dam event
9	March, 2015	Enactus carnival
10	June, 2015	Project avantik

## Rotaract/NSS/YRC Units

Adhigathur village situated nearby was adopted by the Rotaract. An eye check up camp and eye donation awareness camp were organized.

NSS and YRC units of REC have carried out blood donation camps, awareness programmes on health and hygiene, consumer rights, environmental protection etc.

Activities of each unit is monitored and guided by a committed faculty member. The details and plan of activities are informed to all the students. Interested students enroll/register their names and actively participate to contribute their best.

### 3.6.3 How does the institution solicit stakeholder perception on the overall performance and quality of the institution?

The stakeholders' perception on the overall performance and quality of the institution is assessed through feedback obtained from the faculty, students, parents, alumni, inspection committees, visitor's comments, accreditation committees and through

meetings with them. Rating of the institute by external agencies also helps to assess the overall performance and improve the quality of the institution wherever necessary.

**Students:**

- The IQAC coordinates the collection of the following feedback from the students and initiates suitable remedial measures in consultation with HODs/Vice Principal/Principal
- In a 7 point questionnaire at the middle of the semester and in a 20 point questionnaire at the semester end, on the effectiveness of the delivery of each course by the respective teacher
- On the expected program outcome at the end of the program from the respective department passing out student
- During a general counselling session organised at the end of the Unit test-I, every student is counselled by a teacher of another department and his/her feedback is obtained on the academic program and these are consolidated and suitable remedial measures are taken
- Complaint cum Suggestion Box is put up at strategic locations to collect feedback on a host of issues for quality improvement

**Faculty:**

- Interaction of the faculty with Vice principal/Principal to discuss department requirements if any and other academic related issues.

**Parents:**

- Collection of the feedback through HODs by arranging Parent Teachers Meeting held separately for each department once in the semester.

**Alumni:**

- Feedback from alumni in the alumni meeting held once in the year

**Industry:**

- Feedback from the industries on the students working as their employees and also from the industrial experts visiting the department for guest lectures

**3.5.4 & 3.6.5**

**How does the institution plan and organize its extension and outreach Programmes?**

**How does the institution promote the participation of students and faculty in extension activities including participation in NSS, NCC, YRC and other National/International agencies?**

- Allotting dedicated faculty to guide, organize and help in such camps, awareness programmes etc.
- Contribution to extension services is also a parameter considered for the best outgoing student award.

- Seminars on Nuclear Energy, women defense and career guidance are organized. Supply of study related materials to school students, blood donation camps, Swachh Bharat awareness rally, 'Make in India' are some of the other programmes organized.
  - Institution bears the expenditure for the local and national participations.
- Relevant points for this question is also available in 3.6.2 and 3.6.4

**3.6.6 Give details on social surveys, research or extension work (if any) undertaken by the college to ensure social justice and empower students from under-privileged and vulnerable sections of society?**

Training is given by the students to self-help groups comprising mainly of underprivileged women and to school children in the neighborhood. Special coaching in computers, mathematics, and communication skills in English are given. In addition to this, the members of ENACTUS have organized special programmes for automobile mechanics. They have created awareness on the use of millets to prevent diabetes in rural and slum populations. Students visit orphanages and have launched T-Shirt projects where the money earned as profits in selling the T-shirts are given to the other needy orphanages. For a better and cleaner tomorrow the students organize solid waste management programmes in various places in Chennai. Reunite to redefine India, Women empowerment are other social service activities of students. A nearby village was adopted by final year students. An eye check up camp and eye donation awareness camp were organized by the Rotaract club. NSS and YRC units of REC has carried out blood donation camps, awareness programmes on health and hygiene, consumer rights, environmental protection etc.

**3.6.7 Reflecting on objectives and expected outcomes of the extension activities organized by the institution, comment on how they complement students' academic learning experience and specify the values and skills inculcated.**

Sl. No.	Name of the Centre/Forum/Club	Activity
1	Center for fostering Social Responsibility	Coordinating with self-help groups comprising mainly of women and school children
2	ENACTUS Club	Socially relevant activities to enable underprivileged society and orphanages
3	Rotaract Club	Health related camps
4	NSS/YRC Units	Blood donation camps

The expected outcomes are

- Enhancement of confidence level in students
- Imbibing the culture of 'Hard work and Discipline'
- Development of personality and leadership skills
- Inculcation of moral and humane values

Inputs gained from such external exposure compliment the students academic learning.

**3.6.8 How does the institution ensure the involvement of the community in its reach out activities and contribute to the community development? Detail on the initiatives of the institution that encourage community participation in its activities?**

The institution ensures community participation by involving neighbors in the development activities.

For example:

- In nearby Thandalam, the villagers took part in tree planting along with NSS volunteers.
- YRC Volunteers participated in Rally & Slow Race at Marina Beach on “International Day against Drug Abuse and Illicit Trafficking”
- Students participated in painting competition during the celebration of Geneva Convention
- In Ambattur, the community is involved in solid waste management along with ENACTUS- REC members.
- At Velachery, socially underprivileged unemployed women are busy setting up their enterprise with the help of ENACTUS REC.
- The community is benefited by the medical help extended, by awareness and training programmes and by literacy camps.

**3.6.9 Give details on the constructive relationships forged (if any) with other institutions of the locality for working on various outreach and extension activities.**

Constructive relationships are forged with organizations like ENACTUS, ROTARACT and Rotary clubs. The institute has associated with the village panchayat of Thandalam and Pennalur villages and social activities like construction of roads, organizing sports, training in computers, planting of trees, teaching communication skills etc are carried out. The REC ENACTUS team has forged constructive relationship with Ambathur Municipality, Neel Metal Finalica, ITC, Ramky Enviro Engineers, Scorptech Limited, SPEED Trust, Haritha NTI limited, Tamil Nadu Pollution Control Board, National Solid Waste Association of India (NSWAI) and Alaigal NGO to implement its projects. They have also established a tie up with Hero Honda Motors Ltd in which some of the mechanics trained are placed in Hero Honda showroom, Chennai.

**3.6.10 Give details of awards received by the institution for extension activities and/contributions to the social/community development during the last four years.**

‘Melting Point’ a registered refreshment outlet of Tamil Nadu Cooperative Milk Producers Federation Ltd., run by the Entrepreneurship Development Cell (EDC) Student team, won the award by ‘NEN TATA First Dot Judges choice of Top Five Students start ups’ in India in 2012. The EDC cell of REC has received a grant of 7.0 lakhs from AICTE to promote entrepreneurial activities in the campus.

The ‘Entrepreneurial Action by Us’ (ENACTUS) an international community welfare organization has an active wing in REC. It has received a total grant of 2.1 lakhs for its various social service activities, through Unilever Ltd. India, KPMG business ethics grant, Walmart women empowerment grant, Tata chemicals, India and Mahindra ENACTUS competition in 2014-15.

### 3.7 Collaboration

#### 3.7.1 How does the institution collaborate and interact with research laboratories, institutes and industry for research activities. Cite examples and benefits accrued of the initiatives – collaborative research, staff exchange, sharing facilities and equipment, research scholarships etc.

The Training and Placement Cell maintains a symbiotic relationship with industries and is instrumental in signing of MoUs and accreditation by the industries. The various departments of the institution also interact with research laboratories and industries in their concerned areas for research activities. MoUs with research institutes and industries have resulted in collaborative research, staff exchange and sharing of research facilities. The management also funds in- house and innovative projects of the students and many of the final year students execute their projects in reputed industries and research organizations. Based on the merit of the projects the students are given job opportunities and the PG students are offered research programmes in those research centers.

**Few examples are cited below:**

#### **Agreement with TCS on High Performance Computing**

Tata Consultancy Services has entered into an agreement with Rajalakshmi Engineering College (REC) to offer their High Performance Computing (HPC) facilities to faculty and students at REC. Under the terms of this agreement, TCS will offer 6000 node hours of their supercomputing and computer cluster facilities to faculty members and students at REC for solving problems needing complex computations in high end research being carried out by them.

The faculty members in the various research groups at REC are involved in several funded research projects ranging from Bio informatics to Computational Fluid Dynamics. The facilities extended by TCS would meet the complex computational requirements with significant processing time in the various research projects. REC has now joined a select band of elite institutions in the country who have tapped on to High Performance Computing facilities to further cutting edge research in the Campus.

#### **IBM Software Centre of Excellence (CoE) @ Rajalakshmi Engineering College**

The IBM Software Centre of Excellence aims at improving the quality of technical education and increasing the skill sets of the faculty and students, leading to: improvement in the quality of technical education, increase in the employability of students and placing the college in a leadership position.

**IBM**, the IT giant listed **Rajalakshmi Engineering College** as one of the **Top 30 Colleges in IBM TGMC 2010** from over 1,500 colleges and universities.

Through the IBM Academic Initiative, IBM is working with colleges and universities across the country to teach students the open-standards skills they'll need to compete in the ever-changing technology workplace. This initiative offers a wide range of technology education benefits that can be scaled to meet the goals of most educational institutions, ranging from large research universities to local community colleges.

- IBM CoE at Rajalakshmi Engineering College is equipped with the power of cutting edge software technology from IBM. It conducts training for the Students through faculty enabled by IBM. IBM provides Software Training and Professional Certification free of cost in IBM DB2, IBM RAD, IBM TDS, and IBM Lotus Notes. All the software required for the Training program is provided free of cost to the IBM CoE.
- IBM CoE also motivates and trains the students to develop innovative projects for IBM TGMC (The Great Mind Challenge Contest) organized by IBM every year, creates opportunity for the students to get IBM Blue Scholar certificate and mould the scholars as industry ready candidates. A number of students have obtained Blue Scholar Certificates in the recent years.

### **Infosys Campus Connect**

Infosys Campus Connect is a unique academia-industry initiative to “architect the education experience”. This Campus Connect programme is meant for enhancing the quality and quantity of the IT talent-pool and sustaining the growth of the IT industry itself. This nation-wide program aims to build a sustainable partnership with engineering educational institutions in India, and produce “industry ready” professionals by aligning engineering students’ skills with the needs of the industry. REC has signed MoU with Infosys Technologies Ltd and the following programmes were conducted :

1. Faculty Enablement Program on Foundation Program 3.0, Deep Drive FEP on Web Technology and Soft Skill program
2. Road Show at the Campus
3. Students Contest on Programming, Distinguished Engineer and Paper Presentation. Mr.S.Sriram of IT, received First Prize in Distinguished Engineer programme.
4. SPARK Program – Industrial Visit to Infosys Campus. The Students of III Year IT, CSE and MCA visited Infosys Campus, Mahindra City, Chennai.
5. Seminar on various topics like Multithreading, Software Engineering and Project Management.
6. Webinar on various topics like Microsoft VB.Net 2010 and MS Sharepoint 2010.

### **MoU with TANSTIA**

TamilNadu Small and Tiny Industries Association (TANSTIA) has signed an MoU with REC on 25.06.2014 to establish the framework for a collaborative partnership on

consultancy to Micro Small and Medium Enterprises (MSMEs) and Entrepreneurship development activities, Joint research programs and conduct of workshops and conferences in thrust areas. Students of REC will also be provided opportunities for undergoing practical training in MSMEs, undertaking industrial visits and carrying out industrial projects in related disciplines.

**3.7.2 Provide details on the MoUs/collaborative arrangements (if any) with institutions of national importance/other universities/industries/Corporate (Corporate entities) etc. and how they have contributed to the development of the institution.**

**MoUs FOR STRENGTHENING INDUSTRY INSTITUTE INTERACTION**

- MoU with IBM global services, Bangalore
- MoU with Super Auto Forge Chennai
- MoU with Infosys
- MoU with U.S.Technologies
- MoU with Tata Consultancy services on sharing high level computing resources
- MoU with Sutherland Global Services.
- MoU with Faber Sindoori Pvt Ltd
- MoU with Aries Biomed Technology
- MoU with TANSTIA and Ulagin Oli, Chennai

**ACTIVITIES**

- TCS- TCS best student award, faculty development programmes, Guest lectures, and industrial visits to name a few.
- CTS- FDPs, guest lectures, EVOLVE-skill development programmes.
- Infosys Technologies Ltd- Campus Connect programme.
- Wipro Technologies Ltd- Mission 10X programme-FDP for faculty.
- IBM Centre for Excellence.
- L&T Infotech- Centre for entry level training programme “pravesh”
- NASSCOM- Sponsored NASSCOM’s Programmes and HR meets.
- CII- Member in ICT academy & College Excellence Cluster.
- MANDO, INDIA- continuing education programme to industry. Our faculty members conduct courses to employees of Mando India Ltd., in mechanical, electrical, and electronics engineering.
- Biomedical Training for UG and PG students in industries
- Joint conferences with industries

All these activities have contributed to knowledge enhancement of the students in areas related to their specialization and also in allied areas.

**3.7.3 Give details (if any) on the industry-institution-community interactions that have contributed to the establishment / creation/up-gradation of academic facilities, student and staff support, infrastructure facilities of the institution viz. laboratories / library/ new technology /placement services etc**

The college has taken a paradigm shift in training engineering students to cater to the blue chip companies visiting the campus for campus selection. The Training and Placement Cell organizes and coordinates campus recruitments.

The college is proactively engaged in the interaction with various professional and industrial bodies like Confederation of Indian Industry (CII), National Association of Software and Service Company NASSCOM, Society of Automotive Engineers (SAE), Indian Society of Training and Development (ISTD), Indian Society of Technical Education (ISTE), ICT Academy of TamilNadu (ICTACT) etc to promote students interests in different forums.

The Training and Placement Cell also conducts various programmes developed by corporates viz, Campus Commune (TCS), Campus Connect (Infosys), Jump Start, Mission 10x (WIPRO) etc.

Flagship training programmes are conducted for students in Employability Training Camp (ETC). Certificate programmes are offered in TQM. Automotive Society Orientation programmes offer certificate courses in CATIA, CFX, SCJP, MCTS, DBZ – RAAD, Robotics and in embedded systems.

**3.7.4 Highlighting the names of eminent scientists/participants, who contributed to the events, provides details of national and international conferences organized by the college during the last four years.**

<b>Dr. M.P.Koushik</b>	-	Outstanding Scientist, Former Director- DRDO Ministry of Defence, Government of India
<b>Dr.A.Sivathanu Pillai</b>	-	Scientist, Chief Controller R&D, DRDO, Ministry of Defence, Government of India
<b>Shri. E.S.L.Narasimhan</b>	-	Governor, Andhra Pradesh
<b>Dr.R.Chidambaram</b>	-	Principal Scientific Advisor, GOI
<b>Dr. H. Devaraj</b>	-	Vice Chairman UGC
<b>Mr. P. Balakrishnan</b>	-	Chief secretary, Government of Tamilnadu
<b>Dr. S.K. Sharma</b>	-	Professor, Donguuk University, South Korea
<b>Mr.San Murugesan</b>	-	Professor, Multimedia University
<b>Mr.V.Kalyanaraman</b>	-	Professor, IIT
<b>Dr.Mark Clements</b>	-	University of Westminster
<b>Mr.Devine Divekar</b>	-	University of East Anglia
<b>Mr.K.Ramachandran</b>	-	Manager, Corp. Cognizant
<b>Dr.V.N.Rajasekaran Pillai</b>	-	Vice Chancellor, IGNOU.
<b>Omar A. AlHeyasat</b>	-	Professor, Computer Engineering Department
<b>Dr.T.Chithralekha</b>	-	Researcher, Xerox India Innovation Hub, Chennai, India
<b>Dr.T.V.Geetha</b>	-	Professor, Department of Computer Science &

<b>Prof. Jean-Paul Barthes</b>	-	Engineering, Anna University, Chennai, CS Dept, Université de Technologie de Compiègne, France
<b>Dr. San Murugesan</b>	-	University of Western Sydney & BRITE Professional Services, Sydney, Australia
<b>Dr. Kaliraj.N</b>	-	Vice Chancellor-I/C, Anna University
<b>Dr. Yasuhiko Tabata</b>	-	Professor, Kyoto University, Japan
<b>Dr. C. Rengarajan</b>	-	Former Governor, RBI, Guest, Graduation Day

**3.7.5 How many of the linkages/collaborations have actually resulted in formal MoUs and agreements? List out the activities and beneficiaries and cite examples (if any) of the established linkages that enhanced and/or facilitated**

a) Curriculum development/enrichment	- Yes
b) Internship/ On-the-job training	- Yes
c) Summer placement	- Yes
d) Faculty exchange and professional development	- Yes
e) Research	- Yes
f) Consultancy	- Yes
g) Extension	- Yes
h) Publication	- Yes
i) Student Placement	- Yes
j) Twinning programmes	- No
k) Introduction of new courses	- Yes
l) Student exchange	- Yes

**MoUs with Industries**

Sl.No.	Name of the organisation	Nature of activities
1	ABAN, Chennai	<ul style="list-style-type: none"> <li>Improvement in downstream process</li> <li>Bio product development</li> </ul>
2	DEFIANCE Technology, Chennai	<ul style="list-style-type: none"> <li>Combustion studies</li> <li>Emission studies</li> </ul>
3	VALEO, Chennai	<ul style="list-style-type: none"> <li>HVAC</li> </ul>
4	IGCAR , Kalpakkam	<ul style="list-style-type: none"> <li>Corrosion detection</li> <li>Nano- sensors</li> </ul>
5	BSNL, Chennai	<ul style="list-style-type: none"> <li>Student training</li> <li>Guest lectures</li> </ul>
6	TCS, Chennai	<ul style="list-style-type: none"> <li>Guest Lectures, FDPs,</li> <li>Technology Appreciation Programs</li> </ul>
7	SUPER AUTO FORGE, Chennai	<ul style="list-style-type: none"> <li>TIFAC - Industry Partner</li> </ul>
8	HITACHI SOLUTIONS, Chennai	<ul style="list-style-type: none"> <li>Student Training</li> </ul>

### 3.7.6 Detail on the systemic efforts of the institution in planning, establishing and Implementing the initiatives of the linkages/collaborations.

The need for collaborations with the industries and institutions are planned during the Governing Council and College Development Council and IQAC meetings. The deliberations of the meetings are conveyed to the HoDs and the Training and Placement Cell through the Principal and necessary initiatives are taken to implement the same. The departments are also involved in establishing linkages and collaborations with industries and research institutes.

Continuing education programme to industry. Our faculty members conduct courses to Employees of Mando India in Mechanical, Electrical and Electronics engineering

Infosys Campus Connect is a unique academia-industry initiative to “architect the education experience”. The Campus Connect programme is to enhance the quality and quantity of the IT talent-pool; sustain the growth of the IT industry itself. It is intended to increase the employability of students.

One of the gaps that Mission10X program of WIPRO observed in engineering education is the students’ lack of exposure to the latest technology, particularly in their practical work. Also, Mission 10X received many requests from faculty members during the Mission10X Learning Approach (MxLA) workshops to improve the laboratory practices in engineering colleges.

Mission10X came up with Unified Technology Learning Platform (UTLP) initiative to address this. The vision was carefully chosen for this initiative to “Act as catalyst and to collaborate with academia in enhancing the employability skills of engineering graduates by improving their technology skills. In association with WIPRO Mission 10X, UTLF centre on embedded systems has been established at REC and it offers well planned training to the students in the institution.

Robert Bosch signed an MoU with Rajalakshmi Engineering College in the Year 2012 and The BOSCH REC Training Center was inaugurated in March 2013. In Bosch REC, Training is provided for III Year and IV year Mechanical and Automobile Students of REC. Training is given to the Students in Modules and certified.

For example, Christopher Bharath and Prithvi Natarajan, Students of Aeronautical Engineering department won the “Spirit Aero systems Global Design Challenge” award in 2012-13 for their project “Fuselage Design of Passenger Airliner”

**CRITERION IV****INFRASTRUCTURE AND LEARNING RESOURCES****4.1 Physical Facilities****4.1.1 What is the policy of the Institution for creation and enhancement of infrastructure that facilitate effective teaching and learning?**

As per the policy of the institution, well before the beginning of every academic year, the Heads of the departments make a detailed assessment of the following additional requirements

- Faculty members
- Major equipment for the laboratories
- Class rooms
- Computer systems
- Software tools
- Books for the department and main library

In consultation with other faculty members looking after the infra structural facilities, a detailed budget is prepared and sent to Principal who is also the IQAC Chairman. He studies the needs of the department and finalises the list and submit to management for final approval.

The management shows keen interest in the creation and enhancement of infrastructure in the Institution for smooth running of all the academic, co-curricular and extra curricular activities and ensures effective teaching learning processes including seminar halls, hostels for boys and girls, establishment of labs and other research facilities, improvement in academic and administrative infrastructure, maintenance of existing buildings, water supply, inter and intra net connectivity etc. Necessary budget is allocated to upgrade and create needed infrastructure.

**4.1.2 Detail the facilities available for****a) Curricular and co-curricular activities – classrooms, technology enabled learning spaces, seminar halls, tutorial spaces, laboratories, specialized facilities and equipment for teaching, learning and research etc.**

The College is situated in an area of 109588 sq.m. The total area of building constructed is 80495.37 sq.m.

**Details of infrastructure facilities available for effective Teaching, Learning and Research:**

Facility	Total Number	Total Area in sq.m
Class rooms	121	10649
Class room cum studio	9	1386
Laboratories	65	7486
Research Labs	5	308
Seminar Halls	7	1425
Workshop shed (Labs)	11	6014
Drawing Hall	1	194

Teaching Aids	Total Numbers available
LCD projectors	48
Laptops	28
Computers	1780

**Co-Curricular activities:**

Every Department conducts seminars, workshops and technical contests in areas concerning their programmes to strengthen the theoretical and practical knowledge of the students. There are also student members in the respective professional societies and these societies also promote technical activities and student participation. Institution funds and facilitates the conduct of these activities for the benefit of students.

Department	Professional societies
Aeronautical	Aeronautical Society of India
Automobile	Society of Automotive Engineers
Civil	Indian Concrete Institute
Computer Science, IT & MCA	Computer Society of India, ACM and IEEE
ECE	IEEE
EEE	IET
Mechanical	American Society for Mechanical Engineers Society for Automotive Engineers Indian Society of Heating, Refrigeration & Air Conditioning Engineers, Indian Institute of Welding Indian Institute of Industrial Engineers
BioTechnology	Society of Biological Chemists, BRSI,IEEE
Bio Medical	BMES, BMESI, IEEE and IE
Management Studies	Economic Times Club Business Standard Club Madras Management Association
Institutional Membership	ISTE, IET

Seminar halls, classrooms and other amenities as required by the co-curricular activities are made available by the respective faculty co-ordinator. The planning and conduct of the activities are also supervised by the co-ordinators along with the student members.

**b) Extra –curricular activities – sports, outdoor and indoor games, gymnasium, auditorium, NSS, NCC, cultural activities, Public speaking, communication skills development, yoga, health and hygiene etc.**

Dedicated sports facilities with guidance of a qualified physical director are made available to students and courts/fields totally measuring 23,000 sq.m is available for the following.

- |               |                          |
|---------------|--------------------------|
| • Gymnasium:  | • Football               |
| • Volley Ball | • Table Tennis           |
| • Carrom      | • Throw ball & Athletics |
| • Cricket     | • Tennis                 |
| • Badminton   | • Tennikoit              |

Other activities
NSS & YRC <ul style="list-style-type: none"> <li>• Blood Donation camps organized in Indoor auditorium</li> <li>• Helping Orphanages -transport facilities given</li> </ul>
Rotaract club <ul style="list-style-type: none"> <li>• Planting trees - saplings are provided</li> <li>• First aid training - basic kits are supplied</li> </ul>
Unison - Cultural activities <ul style="list-style-type: none"> <li>• Audiovisual and stage arrangements are made available</li> </ul>
Debating club - Communication skills development
Ethics Club - Lectures on ethics
ENACTUS - Social service
Kriya - Entrepreneurship training
ATRIUM - Literary club

**4.1.3 How does the institution plan and ensure that the available infrastructure is in line with its academic growth and is optimally utilized? Give specific examples of the facilities developed, augmented and the amount spent during the last four years (Enclose the Master Plan of the Institution campus and indicate the existing physical infrastructure and the future planned expansions if any).**



**In the last 4 years the following infrastructural facilities have been developed:**

- Research labs
- Additional laboratories
- Additional Library reading area
- Additional hostel blocks
- Additional Canteen/eat-out facility
- Water Treatment plant
- Sewage treatment plant
- Gymnasium

**Facilities nearing completion:**

- Canteen block
- Girls' Hostel (G+8)
- Additional floor in Workshop block
- Extension of ground floor space in administration block
- In the last 2 years, a new academic block with G+7 floors has been built in which apart from classrooms, houses the common physics and chemistry labs and a large computer room with more than 100 systems solely for the first year students.
- A very spacious new canteen has also been built and functioning.
- A fully functional health center with full time doctor and qualified nurse with 6 beds for girls and 4 beds for boys is available in the Workshop Block.
- All the facilities are optimally utilised, such as making labs available even outside working hours for project activities.  
(Refer Annexure for complete master plan)

**4.1.4 How does the institution ensure that the infrastructure facilities meet the requirements of the differently-abled students?**

- i) By providing Lift and Ramps in all academic blocks
- ii) By providing class rooms and other facilities in the ground floor to the extent possible.
- iii) By providing concrete roads inside the campus
- iv) We show extra concern by providing additional counseling.

**4.1.5 Give details on the residential facility and the various provisions available within them:**

- **Hostel Facility:**

	Boys Hostel-I	Boys Hostel-II	Girls Hostel-I	Girls Hostel-II
No. of Rooms	156	110	122	34
No. of Students	369	336	396	102
No. of Staff	10	10	12	2
Internet Lab	1(I floor)	1(Ground floor)	Wi fi Connected	Wi fi Connected

Dormitory	1(Ground floor)	-	2	1
Guest Room	1	5	1	1
T.V Room	1	1	1	1
Tennis court	-	-	1	-
Reading Room/Study Hall	1	7	1	2
Rooms with attached bathroom	28	112	9	75
Common Bathroom	25	13	40	6
Washing room	25	-	5	6
Gym	-	1	-	-

- **Recreational facilities, gymnasium, yoga center, etc**

Yes. The indoor stadium is used for all these purposes.

Indoor Stadium:

- Table Tennis
- Shuttle badminton
- Carom
- Tennikoit
- Yoga

Gymnasium:

- Treadmill
- Weight lifting set
- Dumbbell set
- Elipso

- **Computer facility including access to internet in hostel**

- Girls' Hostel: 10 Systems
- Boys' Hostel: 20 Systems
- With Wi-Fi connection.

- **Facilities for medical emergencies**

- Health centre is available in the college campus with a qualified doctor and a supporting nursing staff.
- In case of emergencies, transport is provided by the college in order to take the students/staff to nearby hospitals.
- An ambulance is always kept ready for transporting patients for emergency.

- **Library facility in the hostels**

- The central library is kept open beyond the working hours to facilitate the use of library by the hostel students
  - **Monday to Saturday** : 7.30 am to 7.30 pm
  - **Holidays (Except Sundays)** : 7.30 am to 7.30 pm

- **Internet and Wi-Fi facility**

The internet connectivity in the campus is 100 Mbps from Reliance & 16 Mbps from Vodafone and Wi-Fi facility is also available.

- **Recreational facility-common room with audio-visual equipments**  
Yes. There are common rooms with audio visual equipments in both boys and girls hostels.
- **Available residential facility for the staff and occupancy**
  - The college has guest suite for faculty and staff members in college to facilitate any requirement for stay in view of official work.
  - Constant supply of safe drinking water

Name of the Hostel	Capacity Liters/hr	Company	Remarks
Ladies Hostel– I R.O Plant	500	MOVF India (p) Ltd.	One time Back Washing Per day
Boys Hostel – I R.O Plant	500	Excel Water System	One time Back Washing Per day
Boys Hostel – II R.O Plant	1000	MOVF India (p) Ltd.	One time Back Washing Per day

- **Security**
  - i) Trained Security Personnel, 25 number are deployed and the college main gates all the instruction blocks, hotels and other strategic locations. Under the supervision of a security officer, they keep constant vigil all the movements inside the campus, take care of the security of all the equipment in the buildings and also check all the outsiders entering the campus.
    - Housekeeping team has 2 supervisors managing 90 persons.
    - Garden maintenance is taken care of by a team of 13 gardeners
  - ii) CCTV Cameras are installed in various vantage points inside college campus.
  - iii) Well laid passages for movement within the campus are provided.

#### 4.1.6 What are the provisions made available to students and staff in terms of health care on the campus and off the campus?

- Health centre is available inside the college campus with a full time qualified doctor and supporting staff nurse.
- Separate observation rooms for boys (4 beds) and girls (6 beds) are available in each.
- A dedicated ambulance is available to help transport patients to nearby hospitals.
- Regular check up and specialised treatment facilities available in the nearby Rajalakshmi Medical College owned by the same trust, can be made use of by faculty, non-teaching staffs and students.

**4.1.7 Give details of the Common Facilities available on the campus –spaces for special units like IQAC, grievance redressal unit, Women’s cell, counseling and career guidance, placement unit, health centre, canteen, recreational spaces for staff and students, safe drinking water facility, auditorium, etc.**

Details of the Common Facilities available on the campus:

Common Facilities	Availability	Block/Floor/Room No.
IQAC	Yes	MCA/MBA /GF/7
Grievance redressal unit	Yes	Acad./IV/412
Women’s harassment prevention Cell	Yes	Workshop/I/1
Counseling and career guidance	Yes	Workshop/III/1
Training and Placement Cell	Yes	Main/Ground /1
Health centre	Yes	Workshop/Ground/4
Canteens	Yes	1.Opposite to Academic Block 2. Adjacent to Boys hostel
Cafeteria	Yes	Near workshop block
Recreational spaces for staff and students	Yes	Indoor Auditorium
Safe drinking water facility,	Yes	RO plants
Auditorium	Yes	Adjacent to Library block
Generator/Power back up facility	Yes	EB Block
Transport	Yes	Transport block

## 4.2 Library as a Learning Resource

**4.2.1 Does the library have an Advisory Committee? Specify the composition of such a committee. What significant initiatives have been implemented by the committee to render the library, student/user friendly?**

Yes. The College has constituted an Advisory Committee for the Library.

Composition:

1.Dr. S.N.Murugesan, Vice Principal	-	Convener
2.Prof. S. Sankar/MBA	-	Member
3.Dr. Johanna Rajkumar, Dean, Biotechnology	-	Member
4.Dr. V.Prasanna Kumari, HOD, MCA	-	Member
5.Mr.J.Benjamin Wilson, Librarian	-	Secretary
6.Mr. K.Sriram, IV year, BT	-	Student Member
7.Mr. Kumaraguru, IV year, EEE	-	Student Member

Its functions are to

- Appoint qualified and efficient library staff.
- Assess the financial support required by the library based on library standards.
- Serve as an interpreter of the requirements of the library to the committee and authorities and recommend for funds needed.
- Provide support to the librarian in taking important decisions having implications for the users (Example: change in working hours, change in rules regarding membership and borrowing privileges etc.).
- Bring better understanding of the role of the library among the users.
- Make provision for sufficient funds for procurement of documents, employment of staff, purchase of equipment, maintenance etc.

#### 4.2.2 Provide details of the following:

Total area of the library (in Sq. Mts.)	: 1620 Sq.Mts
Total seating capacity	: 300 (there is an air-conditioned reading section)
<b>Working hours (on working days and holidays)</b>	
Monday to Saturday	: 7.30 am to 7.30 pm
Holidays (Except Sundays)	: 7.30 am to 7.30 pm

#### 4.2.3 How does the library ensure purchase and use of current titles, print and e-journals and other reading materials? Specify the amount spent on procuring new books, journals and e-resources during the last four years.

Library holdings	2012-13		2013-14		2014-15		2015-16 (till date)	
	No.	Total Cost Rs	No.	Total Cost Rs	No.	Total Cost Rs	No.	Total Cost Rs
Text books	2915	644064	3056	661222	3312	731452	1081	454842
Reference Books	94	101800	93	124350	141	141620	76	97059
Journals/ Periodicals	5981	2262012	6014	2121024	6363	1417714	4403	996183
e-resources	5759	2066118	5772	1998702	6100	1205661	4315	697258
Any other(specify) Library Furniture	3	14616	7	37206	8	47943	16	51960
Total (Rs.)		50,88,610		49,42,504		35,44,390		22,97,302

The respective departments send their requirements for books and journals to the librarian. Based on this, the librarian prepares the budget and submits to the Management in consultation with the library committee. Students are also put in this Committee to provide adequate space for participation of an important stakeholder in the matters of the Library and its usage.

#### 4.2.4 Provide details on the ICT and other tools deployed to provide maximum access to the library collection?

- OPAC : Yes
- Electronic Resource Management package for e-journals : Yes
- Federated searching tools to search articles in multiple databases : Yes
- Library Website : Yes
- In-house/remote access to e-publications : Yes
- Library automation : Yes
- Total number of computers for public access : 10
- Total numbers of printers for public access : 02
- Internet band width/ speed : 61 mbps
- Institutional Repository : Yes
- Content management system for e-learning : Yes
- Participation in Resource sharing networks/consortia : Yes

#### 4.2.5 Provide details on the following items:

- Average number of walk-ins : 400
- Average number of books issued/returned : 300
- Ratio of library books to students enrolled : 8 : 1
- Average number of books added during last three years : 6168
- Average number of login to opac (OPAC) : 200 per day
- Average number of login to e-resources : 1000 per day
- Average number of e-resources downloaded/printed : 3000 on avg per day
- Number of information literacy trainings organized : 4

#### 4.2.6 Give details of the specialized services provided by the library

- Manuscripts : Yes
- Reference : Yes
- Reprography : Yes
- ILL (Inter Library Loan Service) : Yes
- Information Deployment and Notification : Yes
- Download : Yes
- Printing : Yes
- Reading list/Bibliography compilation : Yes
- In-house/remote access to e-resources : Yes
- User Orientation and awareness : Yes
- Assistance in searching Databases : Yes
- INFLIBNET/IUC/ISTE/IET : Yes

**4.2.7 Enumerate on the support provided by the Library staff to the students and teachers of the college.**

Library Staff supports the following activities:

- Registration
- Lending and returning of books
- Book Search
- References
- Scanning and Xeroxing
- ILL
- Internet & Intranet, Downloading and Multimedia
- Library orientation and book exhibition on freshers induction day
- Notice Board displaying the latest information on Jobs
- Display of New Books on “Arrivals” rack
- Seperate Rooms for Books on competitive and career oriented Books
- Question Bank maintenance

**4.2.8 What are the special facilities offered by the library to the visually/physically challenged persons? Give details.**

- The College has high degree of sensitivity to the needs of the differently abled as well as visually challenged persons
- Library staff have been oriented to positively respond to the requirements of the people who need assistance.
- Library block has an elevator to facilitate physically challenged students to reach all library floors.
- Physically challenged persons can authorize other students for library related activities.

**4.2.9 Does the library get the feedback from its users? If yes, how is it analysed and used for improving the library services. (What strategies are deployed by the Library to collect feedback from users? How is the feedback analysed and used for further improvement of the library services?)**

Yes, Feedback is collected annually, based on the recommendations of the students and faculty members who visit the library. Books, e- books and journals are purchased based on the feedback.

Feedback is collected from various stakeholders in the following ways:

• **Faculty:**

- Faculty can also give the feedback on Library resources and services in the Department Meetings, Library Advisory Committee Meetings, Library Committee meetings as well as informal feedback can be shared with the Librarian as well as the Principal through interaction.

- **Students**

- Students can express their feedback in Class committee meetings
- Suggestion cum Complaints Box put up strategic places can also be used by the students to provide feedback.
- Students can provide feedback in the Feedback maintained in the Library

- **Parents**

Parents give their feedback during Parent Teacher Meetings, based on the study material requirements expressed by their wards.

### 4.3 IT infrastructure

#### 4.3.1. Give details on the computing facility available (hardware and software) at the institution. Number of computers with Configuration (provide the different configuration and number of systems available for each) System Configurations

S.No.	Configuration	Make	No. Of PC
1	DELL VOSTRO 3800, Intel core I3@4150, Intel chipset motherboard 4GB 1333 DDR3 RAM, 500 GB 7200 RPM Sata HDD free DOS three years onsite warranty <b>18.5" DELL TFT Monitor</b>	Dell	81
2	Lenovo ThinkCenter M72e Tower-3597BE6 Intel core I3 3220 Intel h61 chipset motherboard 4GB 1333 DDR3 RAM 500 GB 7200 RPM Sata HDD free DOS three years onsite warranty <b>18.5" lenovo TFT Monitor</b>	Lenovo	35
3	Lenovo ThinkCenter M72e Tower-3597BE6 Intel core I3 3220 Intel h61 chipset motherboard 4GB 1333 DDR3 RAM 500 GB 7200 RPM Sata HDD free DOS three years onsite warranty	Lenovo	30
4	Lenovo ThinkCenter M72e Tower-35971Y7 Intel core I3 3220 Intel h61 chipset motherboard 4GB 1333 DDR3 RAM 500 GB 7200 RPM Sata HDD free DOS three years onsite warranty 18.5" lenovo TFT Monitor	Lenovo	50
5	Wipro i-value Desktop i3,2120 3.3 Ghz processor intelH61 original MB 4 GB DDR3 1333 RAM 500 GB SATA2 7200 RPM Hdd 18.5" TFT WIDE Monitor CLR MM Keyboard,Optical Mouse	Wipro	300
6	HCL infinity A380 PC,Intel i3-2100 Processor, 4GB DDR3 RAM,500 GB SataHDD,KB,Optical Mouse18.5"TFT Wide Screen		5
7	HCL infinity A380 PC,Intel i3-2100 Processor,4 GB DDR3 RAM,500 GB SataHDD,KB,Optical Mouse18.5"TFT Wide Screen	HCL	130
8	HCL PC,Intel Core2Duo@2.93GHz,4 GB DDR3 RAM,320 GB Sata HDD,18.5"TFT Wide Screen Monitor,Keyboard,Optical Mouse	HCL	225

9	HCL PC,Intel Core2Duo@2.8GHz,2 GB RAM,160 GB Sata HDD,18.5"TFT Wide Screen Monitor,Keyboard,Optical Mouse	HCL	150
10	HCL P4Core2duo@2.53GHz,2GB DDR2 RAM,250GB Hdd,17"TFT Monitor	HCL	1
11	Zenith P4 Dual Core@1.86Ghz/1GB Ram/120 GB HDD/17"TFT Inbuild, Keyboard,Optical Mouse	Zenith	24
12	HCL P4 Core2duo@2.4GHz,2GB DDR2 RAM,160GB Hdd,17"TFT Monitor,Keyboard,Optical Mouse	HCL	30
13	Zenith P4 Dual Core@1.86Ghz/1GB Ram/120 GB HDD/17"TFT Inbuild, Keyboard,Optical Mouse	Zenith	39
14	HCL PC,Intel Celeron@2.2GHz,256mb Ram,40GBHDD,17"CRT Monitor	HCL	23
15	P4DC @3.0Ghz,512MB DDR2,80GB Sata HDD,Combo,15"CRT Monitor,Cabinet,Keyboard,Mouse	Zebronics	75
16	P4DC @3.0Ghz,512MB DDR2,80GB Sata HDD,17"TFT Monitor,Cabinet,Keyboard,Optical Mouse	Zebronics	100
17	P4DC @3.0Ghz,512MB DDR2,80GB Sata HDD,Combo,15"CRT Monitor,Cabinet,Keyboard,Mouse	Zebronics	100
18	Neptune P IV-2.66 Ghz, Intel 915 Motherboard,256 MB DDR RAM,80 GB HDD, 15" Samsung Color Monitor,Keyboard,Mouse	Neptune	10
19	Acer-2.4 Ghz,256 MB RAM,40 GB HDD,15" Color Monitor, Keyboard,Mouse	Acer	200
20	Intel P4@2.8Ghz,256 MB RAM,40 GB HDD,ColorMonitor,Keyboard,Mouse,Cabinet with SMPS		20
21	Intel P4@2.4Ghz,256 MB RAM,40 GB HDD,15" Color Monitor,Keyboard,Mouse,Cabinet with SMPS	Arrowline	50
22	Intel P IV-1.9Ghz,128 MB RAM,40 GB HDD,10/100 NIC Card,15" Color Monitor,Keyboard,Mouse		70
23	P IV-1.6 Ghz,128 MB RAM,30 GB HDD,10/100 NIC Card,15" Color Monitor,Keyboard,Mouse		60

#### List of systems and the location of availability for Students and Faculty

Sl.No.	Department	Students	Staff
1	Administrative Office		31
2	Aeronautical Engineering	39	12
3	Automobile Engineering	18	10
4	Bio Medical Engineering	25	12
5	Biotechnology	19	22
6	Chemistry		8
7	Civil Engineering	17	9
8	Computer Science Engineering	252	27

9	Electronics and Communication Engineering	139	28
10	Electrical and Electronics Engineering	74	26
11	English	38	5
12	Exam Cell		7
13	Gents Hostel	10	2
14	IBM CoE	33	
15	Internet Lab	55	
16	Information Technology	238	25
17	Ladies Hostel	10	
18	Library	15	12
19	Maths		20
20	MBA		14
21	MCA	60	7
22	ME- EMBEDDED SYSTEM LAB	5	
23	Mechanical Engineering	73	27
24	MEMS Lab	16	4
25	Physics		7
26	Software Development Cell / MIS / EDP/Systems		35
27	Tifac	10	2
28	Training & Placement Lab	66	6
29	UTLP Lab	15	
30	EDC		1
31	PD		1
32	Transport ,CIVIL & EB		13
	Total	1227	373

Systems available in LABs	1227
Systems provided to Staff	373
Miscellaneous	200
Grand Total	1780

- **Computer-student ratio**

UG : 1:4

PG : 1:2

Staff : 1:1

- **Stand alone facility**

NIL

- **LAN facility**

All the systems in the college campus are provided with LAN facility

- **Licensed software**

All Licensed software required for the classes, laboratories, research, training, certification are procured and being used in the campus which includes Microsoft Campus Agreement for Windows Operating System, MSOffice, Visual Studio, MATLAB, Cadence, AutoCAD, ANSYS, Solidworks, Labview, C++, Oracle, various open source software, etc. The versions of the software are continuously upgraded.

- **Software/Systems/facilities used:**

1. SUPER Software
2. CAMS Software
3. E-mail facility with Google Applications
4. Design and maintenance of website
5. Complaint Management System
6. Accounts Management System
7. Payroll Management
8. Moodle LMS
9. Exam Tool
10. Online feedback system
11. KMC (Knowledge Management Cell)
12. SOFETEST – Online examination software
13. Placement Cell Software
14. Exam Cell Software
15. NPTEL
16. Intranet facility
17. CGS
18. SMS
19. Downloads facility

- **Number of nodes/ computers with Internet facility**

- Staff :335
- Boys Hostel :20
- Girls-Hostel :10
- Library :5
- Training and Placement :80
- Internet Lab :53
- Total :503

- **Any other**

- in-house softwares
- Wi-Fi
- Google Application for Education
- User:6576
- Mail Space:25GB

#### 4.3.2 Details of the computer and internet facility made available to the faculty and students on the campus and off-campus?

- Internet facility is available for the students in the Internet centre between 3.15pm to 7.30pm.
- Wi-Fi connectivity for boys' and girls' hostels.
- No. of Systems in Girls' Hostel: 10 systems.
- No. of Systems in Boys' Hostel: 20 systems.

The computer facilities are available to both faculty and students even any time beyond the regular working hours, including holidays.

#### 4.3.3 What are the institutional plans and strategies for deploying and upgrading the IT infrastructure and associated facilities?

A separate team named Centre for Technical Support (CTS) with in-house staff is formed to take care of the IT & related needs of the campus such as Software Development, Hardware & Networking, Website designing & hosting, Email solutions, SMS solutions, etc. CTS has upgraded the IT infrastructure and implemented the following plans.

##### **Software Development**

Currently the campus is using separate packages named REC-SUPER, CAMS, HRMS, etc. for entering and retrieving student and staff data. Integration of all these into a single package is nearing completion and it is meant for automation of most of the transactions in the campus.

##### **Mobile Computing**

Develop an enterprise infrastructure service that supports and promotes the deployment of information and services on mobile devices for faculty, staff, students, parents and visitors. In addition, develop applications, provide ready access to data, and create and support a campus community of developers.

##### **Data Center Services**

Establish a set of core campus data center infrastructure services, standards, and methodologies and provide these resources to a broad range of campus entities.

##### **Data Storage and Retrieval**

Currently data storage and retrieval are done in the individual servers in the department. To enable centralized data storage and retrieval, CTS will establish a suite of (uniformly available) core campus infrastructure services for storage, retrieval, backup, data mining and access.

**High end Networks**

Already wired network (LAN) is available across the campus and a few places of the campus are connected through Wireless. By identifying the network bottlenecks and security risks, CTS will plan and introduce Wi-Fi for the entire campus with necessary firewalls.

**Web Hosting**

The website of the institution is hosted in the campus itself through CTS. By analyzing the hits, bandwidth usage, etc., the configuration of the server will be changed to enhance the speed, improve spam filtering, etc.

**Social Networking**

The institute is already active on social networking sites Facebook and Twitter. CTS will introduce the institute in some other popular networking sites and video-sharing sites to be in touch with the students, faculty, staff and parents.

**Identity and Access Management (IAM)**

Define, develop and adopt a shared suite of IAM services to reduce duplication in our campus IT environment.

**Campus Collaboration Tools**

Define and implement a set of collaboration tools and services to address teaching, learning, research, outreach and campus services needs. (Eg. Webcast the lectures live and host recorded lectures in the website).

**Offer a Suite of Instructional Technologies eLearning Roadmap**

Informed by research, surveys, broader campus initiatives, and the campus community, the Campus e-Learning Roadmap Group will consider traditional and innovative teaching approaches to be shared in the teaching and learning challenges and develop a suite of appropriate instructional technology solutions for campus.

**IT Audit**

Plan periodical IT Audits such as live monitoring and preventive maintenance, patches, updates, log reviews, firewall design and installation, network design, antivirus, malware, spyware, spam prevention solutions, wireless network, web security, etc.

**Biometrics**

To register the daily attendance of teaching and non-teaching staff members.

**4.3.4 Provide details on the provision made in the annual budget for procurement, upgradation, deployment and maintenance of the computers and their accessories in the institution (Year wise for last four years)**

**Budget Head for the year 2011-2015**

<b>Budget Head</b>	<b>2011-12</b>	<b>2012-13</b>	<b>2013-14</b>	<b>2014-15</b>
Capital Equipment(Non-recurring)	19,33,700	90,00,000	50,00,000	60,00,000
Consumables (Recurring)	1,74,175	5,00,000	2,00,000	6,00,000
Maintenance (Recurring)	11,15,725	20,000	50,000	50,000
Renewal (Recurring)	12,72,000	9,00,000	30,00,000	20,00,000
<b>Total Amount Rs.</b>	<b>44,95,600</b>	<b>104,20,000</b>	<b>82,50,000</b>	<b>86,50,000</b>

**4.3.5 How does the institution facilitate extensive use of ICT resources including development and use of computer-aided teaching/ learning materials by its staff and students?**

Staff and students are making use of LCD, NPTEL and Moodle server for their teaching and learning processes.

**LCD usage**

- Faculty members are highly encouraged to use power point presentation for delivering lecture through the use of LCD projectors.
- Every department has one or more LCD projectors.
- Students are encouraged to deliver the seminars, presentations with the modern presentation aids.

**Computers/Tablet/mobile usage**

- Lesson plans are prepared in soft format in the computer and shared with students.
- Attendance, internal assessment and University marks are software based.
- Students' feedback is taken online.

**Application:**

- Analysis of students' feedback is generated using software.
- Centralized database system is available both for staff and students.
- Internet access to all faculty and students help them to access all materials available in other universities and make use of the same for study and lecture delivery.

**NPTEL**

- Lecture videos are uploaded for the benefit of the students and updated in regular intervals.
- College is a designated NPTEL study centre and has a faculty nominated to interact with IIT-M for periodic updates and optimal usage of NPTEL videos.

- NPTEL Online certification exams are coordinated, based on the registrations from students and staff.

#### **Moodle Server (LMS)**

- Conduct of Online aptitude tests, hosting lecture notes, important notes by the faculty is available in this server and students can download the required contents by logging in.
- Apart from this, an online test system developed in-house in VB and Oracle also exists for the benefit of the students.
- Lesson Plan, Notes of Lesson, Question Bank, Quiz, online Assignment, Forums and Wiki for all the subjects are updated in the Moodle every semester for the benefit of the students.

#### **4.3.6 Elaborate giving suitable examples on how the learning activities and technologies deployed (access to on-line teaching – learning resources, independent learning, ICT enabled classrooms/learning spaces etc.) by the institution place the student at the centre of teaching-learning process and render the role of a facilitator for the teacher.**

- ICT enabled classrooms
- Notes and presentations made available by Moodle software
- Group email id is available to distribute learning content to all in a class/department/year
- Individual student email id is provided and managed by the college IT department.
- Wi-fi id and password provided to all students with cyberoam tracking
- Students are encouraged to learn and give seminars on latest topics
- A dedicated heritage centre is available for the tutor to host and present videos relating to area of study
- Competitions to encourage innovative project ideas are conducted and awarded
- Online courses/modules can be learnt from campus upon registration

#### **4.3.7 Does the Institute avail of the National Knowledge Network connectivity directly or through the affiliating university? If so, what are the services availed of?**

No. At present this is not availed of.

#### **4.4 Maintenance of Infrastructure and Facilities**

##### **4.4.1 How does the institution ensure optimal allocation and utilization of the available financial resources for maintenance and upkeep of the following facilities (substantiate your statements by providing details of budget allocated during last four years)?**

- The College gives great prominence to creation, maintenance and upkeep of all the infrastructure necessary for effective teaching-learning, positive development and efficient maintenance.

S. No	Item	14-15 (Rs.)	13-14(Rs.)	12-13(Rs.)	11-12(Rs.)
a	Building	6,85,433	2,00,084	85,092	33,472
b	Furniture	77,940	1,25,486	96,689	26,988
c	Equipment	3,07,206	4,19,257	91,765	1,54,953
d	Computers	32,274	45,032	18,040	9,740
e	Vehicles	3,90,122	1,97,219	1,49,467	7,23,839

#### 4.4.2 What are the institutional mechanisms for maintenance and upkeep of the infrastructure, facilities and equipment of the college?

Separate departments are available for maintaining the following:

Service Department	No. of staff
Electrical lines and equipment	9
Civil works	17
Transport - Mechanics	8
Transport – Drivers	108
Computer servicing	6
House Keeping	90

- Lab equipment – serviced by the concerned manufacturers and service personnel. Wherever necessary annual maintenance scheme is also made use of.

An online service request format, for maintenance and repair of all items, to the concerned departments is available. The model format is as follows: These requests are attended as soon as possible and if needed taken for further processing like procurement of spares etc. Any pending/unattended request beyond a week will reach the administrative representative for necessary follow up and remedial actions.

Date : Monday, May 25, 2015

Staff Code & Name : MC55 | Dr.V.Prasanna Kuman

Designation & Department : Professor and Head | MCA

Intercom No. : / Mobile No. :

Details of Service Needed :

Location of Job : Block : - | Floor : - | Room No. : -  
Others, Specify here :

Post this Request to : (Please don't select your department)

Select the Department

SYSTEMS  
ELECTRICAL  
CIVIL  
ADMIN  
HOUSE KEEPING

Priority : Select the Priority

Register My Service Request...! | Reset

Please Wait few seconds after pressing Register My Service Request

Screen shot of the online service request page

#### 4.4.3 How and with what frequency does the institute take up calibration and other precision measures for the equipments/instruments?

As and when required, the institution takes up calibration and other servicing measures for the equipment/instruments through suppliers and service personnel periodically and in some cases through annual maintenance services.

The departments maintain the complete records of such services.

#### 4.4.4 What are the major steps taken for location, upkeep and maintenance of sensitive equipment (voltage fluctuations, constant water supply etc.,)?

Equipments such as High Performance Liquid Chromatography (HPLC), Polymerase Chain Reactor (PCR) in the Instrumentation Laboratory and MEMS research kits are located in the air conditioned space.

- Necessary precautions are taken depending on the equipment before installing them.
- Stock registers and service requests are maintained by software and in registers.
- Voltage stabilizers and UPS are provided to ensure uninterrupted power supply.
- Water supply provision is made near needed equipments/lab and 24 hour water supply is ensured.
- Periodic maintenance and calibration of the equipment from suppliers, is made on demand or by AMC.

**CRITERION V****STUDENT SUPPORT AND PROGRESSION****5.1 Student Mentoring and Support****5.1.1 Does the institution publish its updated prospectus/handbook annually? If ‘yes’, what is the information provided to students through these documents and how does the institution ensure its commitment and accountability?**

Yes. Every year prospectus and Calendar/Handbook are prepared well in advance and issued with latest information and academic schedule respectively.

- **Prospectus:** Vision, Mission and goals of the institution, profiles of eminent faculty, programmes offered, activities and achievements of various departments including placement and training, entrepreneurship development and innovative project cell activities are given.
- **Calendar:** The calendar carries information about history of the college, Governing Council members, awards instituted for students, rules and regulations to be followed, working days/holidays, dates for tests, odd/even semester academic schedule, parent-teachers Meetings, class committee meetings, semester exams, format for leave letter, on-duty permission, entry of plus two, tests and university marks and famous inspiring quotes etc.
- **Website:** Details regarding facilities in the Departments and activities are also available in the institution’s website. The details of department activities and achievements are also published in the college newsletter. For example, Biosnippets (Biotech), Biorhythm (Biomedical), Electognan (EEE) are some of the department newsletters published periodically.
- The Principal, Vice-principal and one of the Deans formulate the details to be provided in the calendar/prospectus and also ensure that all the information given therein are authentic and as per well laid out norms.
- A committee of Deans and HoDs headed by Principal selects students for the various awards based on the norms set for each award. The adherence to the academic schedules is meticulously monitored by every HoD. The Examination Cell coordinator organises the tests and semester examinations as per schedule; the faculty members in-charge of classes make a result analysis of their class after every Unit Test; Class Committee Chairpersons conduct the Class Committee meetings with subject teachers and student representatives to discuss the students’ performance and initiate remedial measures; academic counselors verify the students’ entry of marks in the calendar and thus every faculty member is accountable for one or more of the student activity and they carry out these with utmost care and commitment.

**5.1.2 Specify the type, number and amount of institutional scholarships / free ships given to the students during the last four years and whether the financial aid was available and disbursed on time?**

**Details of Institutional fellowships (Amount in Lakhs)**

Details	2011-2015
Fee waiver-Merit	23.42
Fee waiver- AICTE Scheme	01.94
Fee waiver- EWS	17.90
Total	40.41
No: of students benefited	92.00

Financial amount is made available and disbursed on time

The list of awards offered to the students annually and particulars of the same are given in the following table:

S No	Name of the Award	Particulars
1	The Raghavan Memorial Award	The award is presented to the college topper of the year, among all the branches of first year students. The award waives the tuition fee for one year.
2	The Lady Parvatham Trust Award	Topper among all branches of II, III, and IV year students are presented with cash prize of Rs10,000
3	GIRI Memorial Award	Best ALL Rounder of the outgoing batch of students are presented with cash prize of Rs10,000 and certificate
4	Thiruvengadam-Sivasailam Endurance Award	Students who endure hardship due to family, financial background, health problems, and even earlier academic misadventure and at the end come out successfully.
5	Prof.V.N.Srinivasan Memorial Award	The Best Innovative Project award
6	P.A. Ramakrishnan Memorial Award	High proficiency in Mathematics based on their marks in the I, II and III semesters
7	REC Faculty Endowment Award	Students for putting in hard work and pursuing their studies in spite of many adversities in life
8	Shri S. Meganathan Entrepreneurship Award	Student who excels in Entrepreneurship activities
9	Shri. K.Sankarathanu Pillai Merit Award	Student who contributes immensely towards issues of societal importance
10	Cash Prizes, Certificate of Appreciation and Books	First and Second Rank in the University examinations every semester in their respective branches of study. Securing Centum in individual subjects. Earning 100% Attendance
11	Sports and Cultural Activities	Medals, Certificates and cash awards for the outstanding performance in Sports and Cultural

**Students receiving awards**



**Students' Innovative Projects**



**Bed that Prevents Bed Sores**



**Remote Controlled Aircraft**

**5.1.3 Number of students receiving financial assistance from state government, central government and other national agencies?**

Yes. Besides providing freships and fee waiver on the part of the institution, the College also facilitates a host of scholarships from different agencies; viz:

Year	Category		
	Central Government	State government	
	SC/ST	BC	MBC
I (Jan 2014-Dec 2015)	77	238	61
II (Jan 2014-Dec 2015)	53	136	67
III (Jan 2014-Dec 2015)	70	102	65
IV (Jan 2014-Dec 2015)	53	81	42

- Muslim Minority Scholarship
- GATE Stipend for PG Students

#### 5.1.4 What are the specific support services/facilities available for

##### a. Students from SC/ST, OBC and economically weaker sections

- Information on various scholarships and funding agencies
- Assistance to obtain scholarship sanctioned by state and central governments
- Fellowship given to deserving cases
- Free Books, special coaching and training given
- Hostel accommodation provided on request
- Waiver of tuition fees

##### b. Students with physical disabilities

- Arranging Class Rooms in the Ground Floors
- Providing Wheel-Chairs
- Lift Facility
- Inhaler for asthma patients
- Information on various scholarships and funding agencies
- Understanding and helpful faculty
- One to one help in library and canteen
- Transport facility to nearby hospitals in case of emergency

##### c. Overseas students

- Career guidance given to students from other countries
- Assistance provided for extension of visas
- Constant interaction with their parents regarding their progress
- Special counseling

##### d. Students to participate in various competitions/National and International

- Guidance given by faculty members in preparing for the events
- Colour uniforms provided
- Prize winning students motivated by providing proportionate contribution of prize money by the Institution
- Travel grant and registration fee provided to attend conferences and seminars
- On duty permission to participate in events
- Transport facilities to attend NSS, YRC camps.
- The events won published in the department newsletters

##### e. Medical assistance to students: health centre, health insurance etc

- Medical Centre with necessary basic facilities available in the campus
- Full time medical assistance with a doctor on campus
- 24 x 7 in-house transport for medical emergency to reach near by hospitals.
- Medical services are free of cost for all inmates
- Availability of medicines, intravenous fluids and first aid facility.
- Separate wards for boys and girls

##### f. Organizing coaching classes for competitive exams

- Coaching / Mock test classes for GRE / GATE / TOFEL examinations by Department faculty members.
- Special career guidance section in the library
- Coaching classes for CAT, GMAT, State and Central Services exam

**g. Skill development (spoken English, computer literacy, etc.,)**

S.No	Types of Skills	Department
1	Communication skills	English Department teachers as a part of regular weekly laboratory programme
2	Aptitude training	Experts arranged by Training and Placement Cell
3	Java	Certification programme arranged by Training and Placement Cell
4	Autocad	Department of Mechanical Engineering
5	.Net and C++	Higher level Training Program conducted by faculty members of Department of CSE and IT.
6	Business management / Entrepreneurial awareness and development	Department of Management Studies conducts weekly programs on these topics to MBA students.
7	British English Certificate	Department of English and British Council , Chennai

**h. Support for “slow learners”**

- Special Coaching Classes and Improvement tests
- Easy to understand learning materials
- Counseling and motivation
- Crash Courses at the semester end for problem oriented subjects
- Arrear Management Classes

**i. Exposures of students to other institutions of higher learning/ corporate / business house etc.**

- Moodle software training for e-Learning
- Participation of students in paper and poster presentation in conferences, seminars and technical symposia
- In-plant training, Industrial visits and projects in other institutions
- Participation in extracurricular activities like debates, Quiz and hands on training like workshops organized by other institutions
- Circulation of brochures and magazines sent by other institutions
- Student participation in cultural, TV and radio shows
- Final semester projects in reputed research institutes and industries
- Webinar lecture series
- Participation in Design Contests
- Certification courses

**j. Publication of student magazines**

- Students are motivated to publish their articles in Symposia / National and International Conferences and journals
- Students contribute to department Newsletters named as ‘**Biosnippets**’ of Department of Biotechnology, ‘**BioRhythm**’ of Department of Biomedical Engineering, ‘**Civilisation**’ of Department of Civil Engineering, ‘**ITVision**’ of Department of IT, ‘**Electrogyan**’ of Department of EEE, ‘**Sonnets**’ of Department of MBA, ‘**Revista**’ of Rajalakshmi Engineering College, Innovative Project Cell-booklets and Entrepreneurship development cell newsletters.

**5.1.5 Describe the efforts made by the institution to facilitate entrepreneurial skills, among the students and the impact of the efforts.**

S No	Name of the Cell	Particulars
1	Innovative Project Cell	Conducts i-Quest competition and seminars for students, promotes their innovative ideas for product development and securing Patents.
2	Entrepreneurship Development Cell	Conducts Entrepreneurship Development Programmes every year. Identifies the Government Enterprises that promote self-employment and builds a relationship between the organization and the budding entrepreneurs of the college.
3	Others	Arranges PALS programmes and Inter Departmental lectures to motivate students to be self employed.

Further, Impact of these efforts are:

- Start up of the Aavin parlour inside the campus, and establishment of Dawn Eco Bio consortium, an entrepreneurial venture of Biotechnology students with the technology developed in the department.
- A Student of Aeronautical Engineering Department was awarded Best Entrepreneur Award.
- Book shop “REC RECEPTACLE” run by students

**5.1.6 Enumerate the policies and strategies of the institution which promote participation of students in extra-curricular and co-curricular activities such as sports, games, Quiz competitions, debate and discussions, cultural activities etc. \* additional academic support, flexibility in test schedule special dietary requirements, sports uniform and materials \* any other**

**Co-Curricular activities:**

The policy of the College is to support all co-curricular activities in the College as it firmly believes that the participation of students in such activities is essential for their holistic development. In this direction, following activities are conducted and support systems are extended

The following Clubs/Associations have been constituted for effectively organizing co-curricular activities:

- ❖ STEM, the Science Technology Engineering and Mathematics club is the first technical driven club in REC managed entirely by a student team, which promotes interdisciplinary project activities and imparts fabrication skills for building electrical and electronic circuits.
- ❖ Students are guided to prepare technical papers and posters on current topics in their specialisation and present them in seminars and conferences. They are also encouraged to participate in technical Quiz competitions. They are given eight days on- duty per semester for taking part in such events.

#### **Extra-curricular activities**

##### **❖ Literary Club and a Debating Union**

These activities in the college are guided by faculty members who train students to participate in debates and oratorical competitions. Every year such competitions are held in the college on the Independence Day and prizes are awarded. Motivation and assistance to participate in international competitions such as WDC have also been provided.

#### **Cultural Committee:**

Staff-Incharge:

- Mrs Alice Hepzibah, Department of EEE
- Mr.Satish, Department of ECE
- Student Members- From all departments

The institution organizes a cultural fest for the benefit of the students to showcase their skill in music, drama and choreography. Special guests/celebrities are invited to inspire students in such activities.

#### **Sports and Games:**

The Policy of the institution is to provide unflinching support to the Sports and Games activities for both teachers and the students. The College believes that a strong mind needs a strong body and in this direction

A full-time qualified Director Physical Education, Mr.Selvamurugamani M.Phil P.Ed., and a Directress Physical Education, Ms.R.Renuka, B.Com, M.P.Ed., have been appointed to train both boys and girls in their game of interest and sports event of their choice.

Some of the achievements of REC students with this dedicated training is as follows during 2014-2015

- ❖ REC squash (Men) team claimed Title in all India inter college squash tournament conducted by SSN College of engineering from 26th to 28th August 2014.
- ❖ REC Shuttle badminton (men) team claimed Title in Anna university zonal Sports conducted by Sri Venkateshwara college of engineering on 18th September 2014.
- ❖ REC women Relay team secured Gold medal in 4 x 100 mts relay in Anna University Zonal Athletic Meet.

- ❖ D.Krishna Arjun of III Aero secured Gold Medal in 400 mts (Men) in Anna University Zonal Athletic Meet.
- ❖ E.R.Jai Narasiman of IV IT secured Gold Medal in Triple Jump (Men) in Anna University Zonal Athletic Meet.
- ❖ M.Anitha of III Aero secured Gold Medal in Triple Jump in Anna University Zonal Athletic Meet.
- ❖ S.D. Arjun of III Aero secured Gold Medal in 400 mts Hurdles (Men) in Anna University Zonal Athletic Meet.
- ❖ R.Manoharan of II M.E (CSE) secured Gold Medal in High Jump (Men) in Anna University Zonal Athletic Meet’
- ❖ M.Benzigar Nolas of IV Auto secured Gold Medal in Decathlon in Anna University Zonal Athletic Meet.
- ❖ REC Throw ball team claimed title fourth consecutive time in SVCE Rolling trophy conducted by Sri venkateshwara College of engineering on 19th march 2015
- ❖ All facilities are made available to students to regularly practise sports events and games of their interest.
- ❖ Inter-departmental sports and games are organised and prizes are given on the Annual Sports Day.
- ❖ Students are encouraged to participate in inter -college tournaments, necessary coaching is given by the Department of Physical Education and the winners and runners-up are awarded with prizes and certificates during ‘Annual Sports Day’ organized every year. Special talents in such students are identified and trained for participating in zonal and state level competitions.
- ❖ Flexible test schedule, special diet and allowance, sports uniform and accessories are provided to sports personnel.

**5.1.7 Enumerating on the support and guidance provided to the students in preparing for the competitive exams, give details on the number of students appeared and qualified in various competitive exams such as UGC-CSIR- NET, UGC-NET, SLET, GATE / CAT / GRE / TOFEL / GMAT / Central /State services, Defense, Civil Services, etc.**

- Coaching / Training / Mock-Test Classes are conducted for various competitive exams such as UGC-CSIR- NET, UGC-NET, SLET, GATE / CAT / GRE / TOEFL / GMAT / Central /State services, Defense, Civil Services, etc.
- The central library has a separate **Career Guidance Section** with the necessary books and journals. The number of students who qualified in competitive exams is as follows:

Academic year	2006 – 2010	2007 – 2011	2008 – 2012	2009 – 2013	2010 – 2014
No. of students	112	142	148	175	205

**5.1.8 What type of counseling services are made available to the students (academic, personal, career, psycho-social etc.)**

Academic counseling		Psycho-social counseling	Career counselling	Personal Counselling
Done by the respective subject teachers, class teacher and HoDs.	Given by a teacher of the other department during general counseling organized every semester.	Students' with personal/family problems if any, are given counseling and support by a professional counselor.	The Placement and Training Cell guides the students in respect of their career prospects.	15-20 Students are allocated to each faculty member for counseling and these students are personally taken care of by these counselors.

**5.1.9 Does the institution have a structured mechanism for career guidance and placement of its students? If 'yes', detail on the services provided to help students identify job opportunities and prepare themselves for interview and the percentage of students selected during campus interviews by different employers (list the employers and the programmes).**

Yes. The institution has a well established and highly structured Training and Placement Cell which systematically provides career guidance and placement initiatives for the students.

The centre organizes

- Campus interviews and recruitment for all the eligible students of final year
- Employability training to students with external experts
- Suitable Value Added Programmes.
- To make the students 'PLUG & PLAY' by imparting soft skills and employability skills.
- Industry-Institute Interaction meetings and MoUs.

**Activities**

- Contacting the recruiting companies regularly for campus placement
- Conducting Campus Recruitments
- Arranging Guest Lectures from Resource Persons from Industry to deliver current knowledge to students
- Arranging Industrial visits, In-plant training and Industry projects to impart practical knowledge and industry practices
- Conducting Career Awareness programmes by Industry Professionals.
- Conducting Soft Skill Programmes to students by Industry Experts.
- Conducting Mock Group Discussion and Mock Interview by HR Professionals.
- Executing activities under MoUs signed with Industries like Infosys, FL Smidth, TCS, IBM, Bosch, Wipro technologies etc.,
- Organising higher educational fairs

### PLACEMENT DAY AT REC



Almost 95% of the eligible students find placement during campus interviews.

#### Facility to conduct Campus recruitments in the campus at All India Level

- Air-conditioned halls to conduct pre-placement talks and other programmes.
- Labs to conduct on line tests and class rooms to conduct other tests.
- Halls to conduct group discussions
- Interview cabins

The list of important recruiters include

Tata Consultancy Services, Wipro, Accenture India, Ashok Leyland, Bajaj Capital, Birla Soft, Cognizant Technology Solutions, Delphi TVS, Dinamalar, Flextronics, HCL technologies, HDFC, ICICI, Infosys , L & T infotech, Mahindra Sathyam, Maruti Suzuki, Orchid Chemicals, Reliance Communication Ltd, Sanmar, Sundaram Clayton, Wuerth, Zoha, JBM Ltd, Schneider Electric, Zifo Technologies, TNQ Publication services, Scientific Publishing Services etc to name a few etc.

#### 5.1.10 Does the institution have a student grievance redressal cell? If yes, list (if any) the grievances reported and redressed during the last four years.

Yes. The College has set up a Students' Grievance Redressal Cell. The composition of the cell ensures student participation in the redressal mechanism and the grievances redressed in the last four years are:

- Regarding food in the mess: By changing the contractor and improving the quality of the food.
- Rush in the canteen –New canteen is opened and different timings for lunch break for different classes
- Need for extra academic input - Special coaching/tutorials in the specific subjects
- Rash driving of the college buses– Suitable action taken against rash drivers.

### 5.1.11 What are the institutional provisions for resolving issues pertaining to sexual harassment?

- The College is highly sensitive to the issues of gender equality, women's rights and the need to prevent sexual harassment.
- The College has set up Prevention of Sexual Harassment Cell established as per the directive of the Supreme Court and the guidelines of UGC/AICTE. This cell also acts as Women Empowerment Cell.
- Dr. Johanna Rajkumar, Dean, Department of Biotechnology is the head of the cell. Ms. M. Sheela, Warden, Girls' Hostel, Mrs. Alice Hepzibah, Department of EEE, Non-teaching staff representative, Ms.Vani, third year students of different engineering departments form the student representatives of the Cell.
- The Cell is entrusted with the responsibility of not only addressing issues of sexual harassment if there are such cases reported, but also endowed with the responsibility of working for Women Empowerment.
- There have been no cases of sexual harassment in the institution so far.

The Women Empowerment Cell also undertakes empowerment programs like Orientation of Gender Equality. Every year in the month of March International Women's day is Celebrated wherein outstanding women achievers from different walks of life such as Entrepreneurs, Doctors, Lawyer, Economics, Artists and media persons are honoured and they deliver inspiration address to women students. To cite a few, in 2013 Dr.(Mrs.) V.Lakshmi Prabha, Principal, Govt. College of Technology College, Coimbatore, in 2014, Mrs. K.Sumathi, Senior Advocate, in 2015, Dr. Kamala Selvaraj, World renowned Gynaecologist and Ms.Pushpa Kandasamy, Successful Entrepreneur are some of the celebrities who participated. In such events we have also screen documentaries made our own students on gender sensitivity and gender equality.



The institution is an active member in CII IWN (Indian Women Network) which promotes women empowerment through organising FDPs, Conferences and brain storming sessions.

### 5.1.12 Is there an anti-ragging committee? How many instances (if any) have been reported during the last four years and what action has been taken on these?

Yes, there is an anti-ragging committee. This committee is meant for taking care of issues regarding ragging and conducts meetings to create awareness among students. Pamphlets are displayed throughout the campus as per the directions of Supreme Court and University. Besides addressing issues of concern on Ragging, the Committee also conducts various awareness programs, empowerment programs etc. Harrasment

Prevention Cell, Discipline Committee also work in coordination with the Anti-Ragging Committee to empower students and create awareness among all the stakeholders in the campus. The disciplinary committee also helps in preventing occurrences of ragging issues. No incident of ragging has been reported in the campus so far.

Composition of the Anti-Ragging Committee:

- Dr.S.Selvaraju, Dean Mechanical Engg.
- The Principal, REC
- The Vice Principal, REC
- Administrative Officer
- Students Care Executives
- Parent representative
- Media representative

#### **5.1.13 Enumerate the welfare schemes made available to students by the institution.**

REC has great concern for the students of the institution. It believes in holistic development of students besides empowering them with knowledge and skills necessary for personal growth, nation building and capable of leading a peaceful and successful life in the society. It has many welfare schemes for students which help them in building a successful career as follows:

- Distribution of state and central government scholarships
- Endowment awards
- Support for participation in conferences, paper presentations etc.
- Funding for in-house and innovative projects
- Supporting facilities for getting educational loan
- Organizing book-fairs, education-fairs etc.
- Career guidance and employability training camps and campus placement Support for participation in curricular, co curricular and extracurricular events
- Arrangement of remedial teaching for slow learners
- Free medical and fitness check up routinely undertaken
- Academic tutor mentorship

Other facilities available for students include library and research facilities available after working hours to carry out projects, subsidized canteen facility, payment of fees in instalments, free learning materials and text books, transport facility for students involved in other co-curricular and extra curricular activities after working hours, waiver of tuition and transport fees in deserving cases.

#### **5.1.14 Does the institution have a registered Alumni Association? If ‘yes’, what are its activities and major contributions for institutional, academic and infrastructure development?**

The Alumni Association of REC “RECAL” is registered with the Registrar of Societies. International Alumni Chapters such as RECAL-UK & RECAL-Dubai also exist. Placement and training cell in coordination with the departments organizes alumni meet every year to review the activities of the current year and plan the activities for the forthcoming year. REC Facebook page, department Watsup groups, group mail ids, etc.

are available to connect with the alumni and conduct face to face alumni interaction programmes.

### **Contributions of Alumni:**

Alumni interact with the respective HoDs and give them information regarding current trends and practices in the industries in which they work, so that suitable improvements in the infrastructure facilities can be made in the institution.

- Alumni also interact with the final year students and guide them in preparing for campus interviews in core and IT companies.
- Alumni help in arranging seminars in key areas.
- Alumni are also involved in guiding certain final year projects.
- Help the department to identify the industries for students to undergo in plant training.
- Arrange for visit to the industry where they are employed.
- Donate books to department library
- Act as ambassadors of the college, resulting in increase in the admission.
- Interactive sessions in providing guidance regarding higher studies, competitive exams and placement for juniors.
- Graduates who have passed out of the institution and are placed in companies, guide and help their immediate juniors to undergo the recruitment process with confidence.
- Feedback on programme outcomes to enhance teaching/learning process of the parent department

### **Details of Annual Alumni Meet**

<b>Date</b>	<b>Venue</b>	<b>No of Alumni attended</b>
26.12.2010	Green Coconut Resort, Muttukadu, Chennai	214
24.12.2011	Green Coconut Resort, Muttukadu, Chennai	243
23.12.2012	Green Coconut Resort, Muttukadu, Chennai	486
03.01.2013	London (REC-UK Alumni Chapter Meet)	18
12.01.2014	Rajalakshmi Engineering College	20
28.09.2014	Dubai	12
01.11.2014	Dubai	13
12.04.2015	Rajalakshmi Engineering College	36
08.05.2015	Seattle USA	8

**Details of Face to Face with Alumni**

Date of Visit	Name of the Alumnus	Department and Batch	Designation/Company Name	Target Audience
05.03.2014	MS. SHALINI	EEE 2007-2011	SIEMENS, UK	3 <sup>rd</sup> year EEE students
17.02.2014	MR. ARJUN	EEE 2004-2008	INFOSYS	3 <sup>rd</sup> year CSE, IT students & 2 <sup>nd</sup> year MCA students
20.02.2013	MR. GNANASKANDHAN. K	EEE 2003-2007	IT ANALYST, TCS	3 <sup>rd</sup> year CSE, IT students & 2 <sup>nd</sup> year MCA students
12.08.2013	MS. SUBHASHREE RAJAN	BME 2007-2011	TRIMEDX	4 <sup>th</sup> Year BME students
11.07.2013	MR. M. SAI VENKATESH	Mech 2008-2012	Ashok Leyland	4 <sup>th</sup> Year Auto, Aero & Mechanical students
08.08.2013	MS.PON. G. NITHYA	ECE 2006-2010	HR (Learning Delivery), TCS	1 <sup>st</sup> Year students
08.08.2013	MR. SRIRAM.S	IT 2005-2009	JALDHI OVERSEAS	1 <sup>st</sup> Year students
08.08.2013	MS. PREETHI RAVINDRANATH	BioTech 2002-2006	Research Associate, UNIVERSITY OF TEXAS	1 <sup>st</sup> Year students

**Some of the outstanding Alumni of REC**

Name of the Alumnus	Department and Batch	Designation
Ms. Archana	EEE 2010	Flight lieutenant, Air Force
Mr.V.Karthick	BT 2010	Captain, Indian Army
Ms.Deepa Nadarajan	BT 2002	Engineer I, -Genentech/USA
Ms.Preethi Ravindranathan	BT 2002	Renowned Research scholar at University of Texas/USA
Dr. Kouser Begam	BT 2002	Scientist, Food and drug administration USA
Mr.Vinoth Gurusamy	AERO 2008	MD,Eco-Friendly Technologies/UK
Mr.Nagarajan G	CSE 1997	CEO,NexTab/Singapore
Mr.Vinayaga Moorthy	MECH 1998	CEO, Sri Durga Engineering & Sri Durga Agro Products/Chennai
Mr. Arun Sakthees R	AUTO 2007	Project Engineer, WABCO India Ltd, Chennai
Ms. M. Arunthathi	BME 2007	Pursuing PhD in Imperial College, London UK
Mr. T.Vijayakumar	ECE 2005	Director, Insight School of Security,Network security and information Security,Chennai

Ms. Muthumalathi	IT 2003	Senior Associate Consultant, Infosys, Chennai
Ms. Karthiga.T	CIVIL 2009	Senior Engineer, Southern Railway, Chennai
Mr.Fabian J A Figredo	MBA 2008	Head – HR/ M/S. Honeywell Techonology Solutiona lab (MNC),Bangalore
Ms. M. Srividhya	MBA 2011	Associate Consultant, Hitachi Solutions India Pvt Ltd, Chennai

## 5.2 Student Progression

### 5.2.1 Provide the percentage of students progressing to higher education or employment (for the last four batches) highlight the trends observed.

Students appearing for competitive exams like GRE, TOEFL, SLET and GATE are on the increase resulting in an increase in the number opting for higher studies. Because of systematic and stringent employability training programmes a drastic increase is seen in the placement of students in companies.

Student progression	%
UG to PG	8-9
PG to M.Phil.	NA
PG to Ph.D.	4
Employed <ul style="list-style-type: none"> <li>• Campus selection</li> <li>• Other than campus recruitment</li> </ul>	95 % of eligible students 5- 8 % other than campus

#### Campus recruitment

Discipline	2015 till date	2014	2013	2012
BE CSE	144	83	81	85
B.Tech IT	96	69	59	72
BE EEE	90	72	70	120
BE ECE	98	61	95	103
BE Mechanical	84	36	57	121
BE Aeronautical	35	19	18	52
BE Automobile	28	11	19	50
B.Tech Biotechnology	49	45	49	91
BE Biomedical	32	29	24	36
BE Civil	18	13	14	N.A
MBA	53	86	14	56
MCA	12	15	07	28
M.E/M.Tech	32	06	03	23
<b>Total Selections</b>	<b>771</b>	<b>544</b>	<b>510</b>	<b>837</b>

5.2.2 Provide details of the programme wise pass percentage and completion rate for the last four years (course wise/batch wise as stipulated by the university)? Furnish programme-wise details in comparison with that of the previous performance of the same institution and that of the Colleges of the affiliating university within the city/district.

Result Analysis for UG course in the last four years												
Dept	Year of Graduation											
	2012			2013			2014			2015		
	Total	Grad	%	Total	Grad	%	Total	Grad	%	Total	Grad	%
CSE	128	95	74.2	130	113	86.9	134	116	86.5	177	148	83.6
ECE	131	109	83.2	126	113	89.6	145	120	82.7	138	118	85.5
IT	119	96	80.6	123	99	80.4	127	109	85.8	122	102	83.6
MECH	131	104	79.3	121	109	90	138	120	85.7	142	122	85.9
EEE	130	115	88.4	118	97	82.2	130	115	88.4	139	114	82.0
BT	116	112	96.5	78	75	97.4	109	105	96.3	99	95	95.9
AERO	69	63	91.3	57	44	77.1	59	53	86.8	65	53	81.5
AUTO	63	49	77.7	67	50	74.6	64	53	82.8	63	49	77.7
BME	63	53	84.1	56	50	89.29	57	54	94.7	52	49	94.2
Civil	NA	NA	NA	62	51	82.26	67	62	92.5	64	51	79.7
	950	796	83.7	938	801	85.4	1030	907	88.06	1061	901	84.9

Result Analysis for PG course in the last four years												
Dept	Year of graduation											
	2012			2013			2014			2015		
	Total	Grad	%	Total	Grad	%	Total	Grad	%	Total	Grad	%
MBA	113	96	84.96	100	76	76.00	116	96	82.76	115	91	79.13
M.E. CSE	16	15	93.75	17	17	100.00	19	18	94.74	23	22	95.65
M.E. Comm Sys	18	18	100	16	16	100.00	14	13	92.86	18	17	75.56
M.E. Soft Engg	18	16	88.89	15	15	100.00	16	16	100.00	17	16	94.12
M.E CAD/CAM	14	13	92.86	NA	NA	NA	NA	NA	NA	NA	NA	NA
M.E. PED	17	17	100	14	13	92.86	18	17	94.44	16	16	100

M.Tech BT	18	18	100	15	15	100.00	14	14	100.00	11	10	90.91
MCA	49	46	93.88	84	69	82.14	65	60	92.31	36	35	97.2
M.E. Comm Sys(PT)	1	1	100	NA	NA	NA	NA	NA	NA	NA	NA	NA
M.E. Soft Engg(PT)	1	1	100	2	2	100.00	2	2	100.00	1	0	0.0
ME. ENGINEERING DESIGN	NA	NA	NA	8	8	100.00	12	11	91.67	15	15	100
ME. MEDICAL ELECTRONICS	NA	NA	NA	16	14	87.50	11	10	90.91	18	18	100
ME. EMBEDDED SYSTEMS	NA	NA	NA	NA	NA	NA	17	17	100.00	18	18	100

Comparison with the other affiliating colleges within the district is not available. But based on the previous year performances, the pass percentage of the college is maintained above 90% for PG and 85% for UG courses.

### 5.2.3 How does the institution facilitate student progression to higher level of education and/or towards employment?

The institution facilitates the students for higher level of education and employment by providing employability camps.

The employability camp enables students to acquire employability skills and confidence to perform well in the interviews and subsequently in the corporate environment.

It also provides a platform for the students to know about the high potential courses that need to be pursued in order to excel in higher education. A database of the students interested in higher studies is maintained.

Career guidance programmes, personality development programmes and education fairs are organized every year. Articles on higher education in leading newspapers sent as links to the student individual ids.

Career guidance cell offers resources, guidance and support for students aspiring for higher studies in India and abroad. Information on university programmes, cost of studies etc

Higher Education Fairs focusing mainly on study abroad conducted every year. Gate qualified students get their fellowship for their PG programmes.

#### 5.2.4 Enumerate the special support provided to students who are at the risk of failure and drop out?

The IQAC of the College conducts Comprehensive Academic Audit besides collects feedback on a host of activities from various stakeholders. As a result of such strategies, the IQAC devises different programs for the benefit of all the stakeholders. Students at the risk of failure or end up as dropouts are monitored by the IQAC through the Mentor System. Mentors keep a record of the students' family background, past performance, results of unit tests and Model exam, and through the following strategies address the issue. However the drop out rate in the College is only less than 0.5% which is insignificant.

- Attendance Monitoring
- Special academic coaching
- Discussion with Parents
- Counseling by professional counselors
- One-to- one meeting with all subject faculty members
- Providing easy to understand notes
- Providing well framed answers for university questions
- Encouragement by peers
- Motivation by alumni

### 5.3 Student Participation and Activities

#### 5.3.1 List the range of sports, games, cultural and other extracurricular activities available to students. Provide details of participation and program calendar.

REC strongly believes in the holistic development of students. With a view to give space for multi-dimensional growth and achievement, the students are provided with facilities like games and sports, cultural activities, recreational avenues for acquiring and exhibiting their talent.

##### **Sports and games available to students:**

- The Sports Department of the College is headed by Mr. Selvamurugamani who is a fulltime physical director and Ms R.Renuka, the physical directress
- There is a well equipped Gym

### Facilities for the following games have been created

- Basket ball
- Tennis
- Volley ball
- Cricket
- Badminton
- Football
- Throwball
- Carom
- Chess
- Tennikoit

### Facilities for the following Sports have been created:

- sprint
- high jump
- long jump
- discuss
- shotput
- relay events

### Culturals:

Dance, Drama, Musical Band 'UNISON'



### Other Extra- curricular activities:

ATRIUM	:	Literary Club
YAZH	:	Language Literary Club
SIFE/ENACTUS	:	Students in Free Enterprise
NSS	:	National Social Service
YRC	:	Youth Red Cross
ROTARACT	:	For community services and volunteers for college functions, Blood donation camps etc,
ETHICS CLUB	:	To inculcate ethical practices
DEBATING UNION	:	To encourage students to participate in debates.

Enactus Club of Rajalakshmi Engineering College was initiated in the year 2006. It has conducted several community service oriented events.

Following is the programme calendar of the Enactus Club for the year 2014-15.

S. No	Date	Event
1	15 <sup>th</sup> August, 2014	Lake cleaning
2	23 <sup>rd</sup> August 2014	Beach cleaning
3	5 <sup>th</sup> September 2014	Initiation day
4	15 <sup>th</sup> October 2014	Rice bucket challenge
5	20 <sup>th</sup> November 2014	World environment day
6	11 <sup>th</sup> November, 2014	Clean India green India
7	14 <sup>th</sup> February, 2015	Old age home - valentines day
8	1 <sup>st</sup> March, 2015	Dam event
9	March ,2015	Enactus carnival
10	June 2015	Project avantik



Enactus REC- Eureka Child Survey/Project Parisudham

**5.3.2 Furnish the details of major student achievements in co-curricular, extracurricular and cultural activities at different levels: University / State / Zonal / National / International, etc. for the previous four years.**

Since the achievements of the students are exhaustive the details will be made available during the peer team visit. However, some important achievements of a few students are shown as an example:

Name of Student	Batch	Type of Training	Prizes /Awards
Shravanthi Krishna	2012-16	International	Hargobind Khorana Indo – US Research Fellowship for scholars 2015
K.Sriram	2012-16	National - Voice for BT-2015 Inter Collegiate Public speaking contest on Biotechnology organized by Novozymes South Asia Pvt Ltd Bangalore	Summer Fellowship 2015 offered by the Indian Academy of Sciences, Bangalore.
K.Sriram	2012-16	National –Voice for BT -2015	Internship at Novozymes
Sanjeevi L.R.	2011-15	National	ICTACT Student Innovator Award 2014

D.Harinee	2009-13	National- Voice for BT-2013 Inter Collegiate Public speaking contest on Biotechnology organized by Novozymes South Asia Pvt Ltd Bangalore	1 <sup>st</sup> prize -Rs 25,000 Internship at Novozymes
T.Revathe	2010-14	National Level Students Summit on green technologies and sustainability-paper presentation	1 <sup>st</sup> prize
P.Priyadarshini	2010-14	National Level Students Summit on green technologies and sustainability-poster presentation	1 <sup>st</sup> prize
R.Shantinee	2011-15	National level- Sarang British Parliamentary Debate, IIT Madras	Best Adjudicator Award Rs.8000
N.Nandhini	2010-14	National Student Brand Ambassador for WIPRO	-
NandhiniGiri	2009-13	International-Fujiocup Quiz on stem cells and Regenrative Medicine	2 <sup>nd</sup> prize Cash Award of Rs.10,000

### 5.3.3 How does the college seek and use data and feedback from its graduates and employers, to improve the performance and quality of the institutional provisions?

Feedback is obtained from the alumni on the attainment of Programme Educational Objectives and also from the employers on the performance of alumni placed with them. Wherever there are inadequacies, steps are taken to overcome them and suggestions for improvement are studied and appropriately implemented.

#### Feedback from alumni:

The Training and Placement Cell in co-ordination with the faculty members in charge of each department has been collecting feedback from alumni.

The departments have created group e-mail ids in which one or two of the faculty have joined as members. This arrangement facilitates regular interaction with the alumni and helps the department to understand their progress and obtain necessary feedback at the central level. The Training and Placement Cell co-ordinates the activities such as alumni meet, alumni association etc.

#### Employers' feedback:

The Training and Placement Cell is continuously associated with the organizations in which the alumni are placed.

The feedback is obtained through the telephonic discussion with the HR Personnel and other senior officials of the organization and also through collection of details by sending a structured questionnaire.

**Community feedback:**

The NSS Unit of the college has been actively involved in rendering services such as conducting awareness programmes in environmental protection, health, first aid and general safety. Further, blood donation camps, literacy camps and teaching computer fundamentals to rural children are some of the other activities.

The students collect the feedback of the people on the services rendered to them, suggestions for improvement and scope for expansion. This feedback helps to improve the quality of service in the future camps.

Based on feedback received, improvement in infrastructure, training programmes certificate courses, industrial visits, guest lectures and enhanced co-curricular and extra-curricular activities are organized to enhance the overall performance of students and quality of education in the institution.

**5.3.4 How does the college involve and encourage students to publish materials like catalogues, wall magazines, college magazine and other material? List the publications/materials brought out by the students during the previous four academic sessions.**

Students contribute to department Newsletters named as ‘**Biosnippets**’ of Department of Biotechnology, ‘**BioRhythm**’ of Department of Biomedical Engineering, ‘**Civilisation**’ of Department of Civil Engineering, ‘**ITVision**’ of Department of IT, ‘**Electrogyan**’ of Department of EEE, ‘**Sonnets**’ of Department of MBA etc.,

‘**Revista**’ the annual college magazine of Rajalakshmi Engineering College is published every year which has in its editorial board student representatives apart from faculty members. This magazine carries information on department activities and also articles contributed by teachers and students. Innovative Project Cell publishes booklets on the projects submitted by the students for iQUEST and details of prize winning projects and judges for the event is also provided in this booklet. Two attractive editions of outstanding innovative projects have been published as “**Innovations at REC**”.

The Entrepreneurship Development Cell “**Kriya**” publishes its newsletter periodically and also the quarterly edition of college newsletter which disseminates information on various activities of the college and the departments.

Students contribute articles to college magazine, department newsletters, innovative project cell booklet and newspapers.

College also guides students in the preparation of technical papers and posters for presentation in conferences. The students are motivated by providing on-duty permission, flexibility in test schedule and by giving proportionate prize money.

Mobile Apps have been developed by students of Computer Science and Information Technology Departments.

Wall magazines are displayed in the department notice boards, facebook, class rooms and laboratories.

**5.3.5 & 5.3.6 Does the college have a Student Council or any similar body? Give details on its selection, constitution, activities and funding.**

**Give details of various academic and administrative bodies that have student representatives on them.**

- Students' professional societies
- Economic Times Club
- Business Line Club
- Rotaract Club
- Association of Aeronautical Engineers
- BT Society
- Library Committee
- Alumni Association
- Class Committee
- NSS
- YRC
- Entrepreneur Development Cell- Kriya
- SIFE/ENACTUS
- Literary Club – Atrium
- Language Literary Club - Yazh
- STEM
- Cultural Committee
- Other Committees

The members for the various bodies are selected by the respective faculty co-ordinator and activities are initiated for their effective functioning for the academic year. For example, members of this alumni association meet once in a year at a common place and elect the office bearers of the association and plan for the next year. Funding is provided by the management and also borne by alumni for international meetings.

**5.3.7 How does the institution network and collaborate with the Alumni and former faculty of the Institution.**

The institution networks and collaborates with the alumni by arranging alumni meets every year. The alumni association of the institution has been registered as RECAL with the Registrar of Societies. There are also International Alumni Associations of REC, Viz RECAL –UK and RECAL –Dubai.

All departments have an alumni faculty coordinator who keeps record of the alumni and communicates through e-mail.

Alumni meet is conducted every year and get their updates about future of students in the job market. The institution implements most of the suggestions given by them in the interest of the students.

Many of the former faculty members of the institution, visit the campus periodically, share the experience and provide valuable suggestions and help in organizing FDPs, and guest lectures etc.

**CRITERION VI****GOVERNANCE, LEADERSHIP AND MANAGEMENT****6.1 Institutional Vision and Leadership**

**6.1.1 State the vision and mission of the Institution and enumerate on how the mission statement defines the institution's distinctive characteristics in terms of addressing the needs of the society, the students it seeks to serve, institution's traditions and value orientations, vision for the future, etc.?**

**VISION:**

To be an institution of excellence in Engineering, Technology and Management Education and Research. To provide competent and ethical professionals with a concern for the society.

**MISSION:**

To impart quality technical education imbued with proficiency and humane values. To provide right ambience and opportunities for the students to develop into creative, talented and globally competent professionals. To promote research and development in Technology and Management for the benefit of the society.

The mission statement reflects the institution's distinctive characteristics:

- To train the students to face the global challenges
- To venture into creative ideas through research activities
- To develop products and procedures based on societal needs
- Serving the society with commitment

**6.1.2 What is the role of top management, Principal and Faculty in design and implementation of its quality policy and plans?**

REC, since its inception has been imparting quality technical education. The Rajalakshmi Educational Trust is dedicated to establish, nurture and develop world class institutions of higher education. The Trust aims at developing Centres of Excellence, help young researchers and industries through innovative product design and development. The Trust proposes to involve in community service such as awareness programmes in education, health, safety, environmental management etc., towards enabling the rural community to reap the benefits of development. The Governing Council and College Development Council consist of eminent academicians, industrialists and administrators.

**The objectives of the council are**

- To guide and advise the management in running the college efficiently
- To guide and help the management in the developmental activities of the college and its future planning.

**Correspondent**

The correspondent provides long term strategic guidance and direction to the college. He plans commencement of new courses, increase in the student intake, maintenance and expansion of infrastructure and other strategically important matters.

**Chairperson:**

The Chairperson guides the general administration of the college on a day-to-day basis towards the achievement of the Vision and Mission of the College.

**Principal:**

Principal is the head of both the academic and administrative bodies including IQAC. He plans and coordinates all the academic and administrative activities. He closely interacts with the Deans and Heads of the various Departments and constantly monitors the teaching –learning processes, evaluation systems and students' performance improvement plans.

Principal is the governing Member Secretary of the Governing Council of the college and it is his responsibility to convene at least one meeting per semester. The Principal makes recommendations for the future planning and development of the institution. He also

- monitors progress of all the academic activities
- implements university guidelines in the institution
- takes care of the fulfilment of all the curricular requirements
- advises the management on introduction of new courses, faculty recruitment, upgradation of existing infrastructure facilities etc.
- heads the Interviewing Committee for faculty recruitment as its Chairman
- takes care of faculty development and motivates faculty and students wherever necessary
- arranges general counseling for the students every semester
- takes care of students, faculty and staff welfare, their career, higher studies etc.
- functions as the chief warden of the hostel students

**Administrative Officer:**

Administrative Officer looks after the administrative aspects of the college including

- admissions
- students grievances redressal
- maintenance of the student related records, certificates and university correspondence
- looks after the maintenance of services such as infrastructure, hostel, canteen, transport, etc.
- liaison with AICTE, Anna University, University of Madras and other Statutory bodies
- conducts meetings, examinations and making fastidious arrangements for audio and video for major functions like College Day, Graduation Day and Initiation day.

**Accounts Officer:**

Accounts Officer maintains vouchers, records and accounts and looks after

- cash collection and payments
- collection of fees and follow up
- revenue and capital budgeting and monitoring
- other related activities

**Head of the Department:**

- designs the Vision, Mission, Programme Educational Objectives (PEOs), Programme Outcomes (POs) of the department in consultation with the Department Advisory Board.
- is responsible for the overall functioning of the department and infrastructural development
- makes the subject allotment based on the specialization and experience of the faculty members.
- supervises the conduct of internal assessment tests and students performance
- periodically reviews all academic activities and sends a copy of the review to the Principal. Plans and monitors the conduct of all the co- curricular activities such as symposia / workshop / seminar, value added courses
- interacts with industries and arranges for collaborative activities and coordinates with the Training and Placement Cell in arranging In-plant training, Guest Lectures, Industrial Visits and facilitates students' placement.

**Faculty Members:**

- maintain a high sense of dedication towards duties and responsibilities.
- discharge all the duties and responsibilities assigned by the Principal, Dean and Head of the department from time to time.
- adhere to the rules and regulations of the institution and maintain very high order of integrity and character.
- handle the classes with thorough preparation and use the best teaching practices to make the classroom learning an interesting and informative experience for the students and also attend to lab classes.
- supplement the syllabus with inputs on emerging trends.
- counsel the students, identify their difficulties in learning and guide them to improve their performance.
- identify the bright students and motivate them towards better performance and kindle their R & D pursuits.
- maintain the class in perfect order and discipline.
- guide students' co-curricular activities and encourage their participation in extra-curricular activities.
- Pursue higher studies, equip themselves with the latest development in the chosen field and always upgrade their knowledge, pursue research, carry out sponsored projects and publish books and papers in reputed journals.
- Actively associate with all departmental and institutional activities like arranging guest lectures, industrial visits, seminars, workshops and organizing other events.

### 6.1.3 What is the involvement of the leadership in ensuring

- The policy statements and action plans for fulfilment of the stated mission
- Formulation of action plans for all operations and incorporation of the same into the institutional strategic plan
- Interaction with stakeholders
- Proper support for policy and planning through need analysis, research inputs and consultations with the stakeholders
- Reinforcing the culture of excellence
- Champion organizational changes

The Leadership of the College is positively involved in the development and growth of the College. The Top Management as well as other stakeholders represented by the Principal make policy framework for the vision, mission and the Perspective Plan of the College.

#### **Action plan by the leadership for fulfilment of the stated mission by**

- Adopting procedures for excellent teaching- learning processes
- Expansion of infrastructure and human resources to meet the increasing academic and research demands
- Training and skill up gradation to make the students globally competent
- Organizing programmes to inculcate ethical values
- Community service through different units to imbibe humane values.

#### **Formulation of action plans for all operations and incorporation of the same into the institutional strategic plan**

The Governing Council and College Development Council, IQAC along with Principal and the respective departments formulate action plan and incorporate the same into institutional strategic plan such as

- organizing value added programmes for holistic development of students
- encouraging research and development activities
- promoting community services

#### **Interaction with stakeholders**

The leadership initiates interaction with stake holders by organizing

- parent-teachers meeting
- faculty meeting
- industry sponsored projects and pertinent MoUs, certificate courses and sabbatical training
- meeting with industry experts who visit the college for special lectures, project reviews and other functions

- meeting with students and alumni obtaining their feedback and initiating necessary improvement measures

### **Proper support for policy and planning through need analysis, research inputs and consultations with the stakeholders**

In tune with current global and national scenario the needs are analyzed, planned and implemented in consultation with the stakeholders. For eg:

- formation of Research and Consultancy Advisory Board to promote research activities
- training and certification programmes in consultation with industry personnel to make the students readily employable
- conduct of various clubs like Ethics Club, STEM, ATRIUM, KRIYA based on the students' needs

### **Reinforcing the culture of excellence**

The motto of the institute being ‘hard work and discipline’ excellence is aimed in every activity by careful planning and implementation, eliciting the co-operation of all the stakeholders. The IQAC of the College is endowed with the responsibility of spreading quality culture with a host of quality policies, strategies and programs aimed at creating quality consciousness among all the stakeholders. The IQAC of the College provides suggestions for the

- Conduct of Orientation Programs
- Implementation of quality strategies
- Conduct Comprehensive Academic Audit
- Collection of Feedback of various and varied stakeholders
- Organization of lectures and interaction programs on quality issues, strategies, tools and methods.

### **Champion organizational changes**

- The Management and the top administrative set up is sensitive to the needs of all the stakeholders and interacts with each component from time to time.
- Any organizational change is smoothly managed through interaction, feedback and support systems
- Whenever changes are effected in any set up, the sentiments of the stakeholders are appropriately considered
- Through Orientation and interaction, any transition is smoothly facilitated and managed.
- Organizational changes in terms of appointment of Academic Deans, Examination Cell Coordinator, Students Mentor, and Members for the Research and Consultancy Advisory Board, IQAC and ISO Coordinators etc., are made whenever needed.

#### 6.1.4 What are the procedures adopted by the institution to monitor and evaluate policies and plans of the institution for effective implementation and improvement from time to time?

- The institution has taken intensive steps to maintain quality in academics and in administration and has obtained the ISO 9001:2008 certifications from TUV, NORD, Germany in March 2013 for maintaining ISO standards. Earlier, the college was certified for ISO 9001:2000 standards by TUV Sudddeutschland, Germany in April 2002 and was subsequently recertified in 2005.
- The college has been accredited / reaccredited by the National Assessment and Accreditation Council (NAAC) in 2007 and 2014 respectively.
- All the eligible under graduate programmes have been accredited/reaccredited by the National Board of Accreditation (NBA), New Delhi.
- Seven programmes, viz., B.E. Mechanical Engineering, B.E. Electronics and Communication Engineering, B.E. Electrical and Electronics Engineering, B.E. Computer Science & Engineering, B.Tech. Information Technology, M.E. Computer Science and Engineering and Master of Business Administration (MBA) have been granted Permanent Affiliation by Anna University, Chennai.

The institution improves the quality of its academic programmes in the following ways also:

- Scrutiny of students' projects by industrial experts.
- Continuous Assessment of teachers and students.
- Conduct of class committee meetings for students' performance analysis
- Monthly review of academic processes and progress by HoDs
- Incorporating the inputs received from industry experts in emerging areas of Engineering and Technology suitably in the teaching-learning process to provide an edge over the curriculum prescribed by the university with an ultimate aim of turning out competent professionals.
- Obtaining periodical feedback from parents, students, external experts
- Systematically maintaining staff & student database.
- Online access to data relating to staff & students.
- Communication facilities such as Intercom, Internet, Intranet

**Regular courses are framed by the university and the college effectively implements them by adopting the following:**

- Use of modern teaching aids
- Issue of lesson plan, notes on lesson, question bank and university questions to the students in the beginning of the semester.
- Information regarding academic activities given in advance (Tests, Syllabus Completion, University Exam, etc.)
- Conceptual understanding sessions
- Conducting technical seminars fortnightly
- Arranging guest lectures, industrial visits and in- plant training
- Allowing students to organize Seminars, Conferences, Competitions, Technical Festivals, Science Exhibitions, Cultural Programmes etc.

- Encouraging students to participate and present papers and projects in National and International Conferences.
- Kindling their research interest through Innovative Project Cell competition, i Quest.
- Encouraging the participation of students in NSS and YRC activities to improve their overall personality and to imbibe an attitude of service to the society.

#### 6.1.5 Give details of the academic leadership provided to the faculty by the top management?

The Principal is the academic as well as the administrative head of the College.

The faculty members are actively involved in decision-making process at all levels. They are members of IQAC, Class Committee, Department Review Committee, Purchase Committee, Discipline Committee, Campus Monitoring Committee, Techfest Committee, Innovative Project Cell, Placement Committee, Alumni Association, Time table committee, Anti-ragging Committee, Anti-Ragging Squad and other committees for the various college functions like College Day, Graduation Day, Sport Day etc. In the meetings of the above mentioned committees the faculty members give suggestions based on their earlier experience for further improvement. In all the student centric activities also the faculty members have important role to play, recommending places for industrial visits, in-plant training, topics for final year, summer and winter projects, student discipline, development programmes, seminar, conferences, cultural etc.,

Management of REC always supports all the suggestions for improvement and thereby a healthy work culture and atmosphere are created. The faculty members are given the authority and responsibility to complete the desired academic task in the best possible manner within the stipulated time.

#### 6.1.6. How does the college groom leadership at various levels?

##### At Student Level:

- Selection of class pupil leader as class committee members
- Conduct of student centric college events like conferences, Tech. fests, cultural, sports etc.
- Involvement and coordination roles to students in all college activities, Club/Committee/Association activities
- Editorial board of College Magazine and Department Newsletter
- Organization of community services through NSS, YRC, SIFE, Rotaract etc.
- Active participation in entrepreneurial ventures and placement initiatives

##### At Faculty level:

- Freedom to take up academic pursuits and student related activities
- Organizing industrial visits and workshops
- As mentors and class advisors
- Planning and execution of several department activities, budget, purchase etc
- As coordinators for the preparation of ISO, NBA, NAAC inspections.

- Organizing College Day, Graduation Day, Independence Day, Sports Day and other functions

**As Head of the Department:**

- Planning , execution and monitoring the performance of the department
- Heading all the administrative and academic activities of the department and other committees mentioned earlier.

**As Principal:**

- Heading all the administrative and academic activities of the Institution

All the faculty members are involved in all the activities of the College. The senior staff members are appointed as conveners of various committees. Various co-curricular and extra-curricular activities are conducted under the guidance of faculty members with student representatives. In this way the college grooms leaders at all levels.

**6.1.7 How does the college delegate authority and provide operational autonomy to the departments / units of the institution and work towards decentralized governance system?**

The institution believes in promoting a culture of decentralized governance system.

For example:

The Head of the Department has the authority in deciding the activities and delegating the responsibilities to the staff members of the department.

The department decides on timetable, subject allocation, purchase and maintenance of equipment and consumables, organizing guest lectures and workshops and recommends necessary industrial visits, in-plant trainings, MoUs and work towards achieving its vision and mission.

Administration: Freedom to organize the administrative activities in accordance with the institutional policies.

**6.1.8 Does the college promote a culture of participative management? If ‘yes’, indicate the levels of participative management.**

The college promotes culture of participative management which enables staff and students to give their opinions and suggestions for improvement. All academic and administrative activities are decentralized and decisions are taken based on discussion and deliberations in class committee meetings, department meetings, monthly faculty meetings and HoDs meeting with Principal and Deans. Finally the Principal coordinates with departments, administration and management. Participative management allows

collaboration with departments and thereby improves the quality of planning and implementation of all the activities in the institution.

## 6.2 Strategy Development and Deployment

### 6.2.1 Does the Institution have a formally stated quality policy? How is it developed, driven, deployed and reviewed?

Based on the vision and mission, the Governing Council and the College Development Council develop the following quality policies taking also into account the needs of the industry, society and global market.

#### Quality objectives of the institution:

- To deliver the curriculum prescribed by the University in the best manner and to ensure that the students graduate with Anna University degree certification.
- To maintain the teaching-learning process innovative, interactive and in-depth and to ensure an effective relationship between the curricular content and practical applications.
- To promote and maintain a serene campus with a scientific fervor.
- To promote co-curricular and extracurricular activities.
- To provide value added programmes and international certification programmes, to bridge the gap between academia and industry and to make the students globally competent and employable
- To promote R & D activities and kindle the aptitude for research and creative thinking of the students and to encourage their innovative ideas and projects.
- To provide a forum to practice ethical standards with a concern for the society.

In the following ways quality policies are developed, driven and deployed Enhancing intellectual capabilities through innovative and technology enabled teaching-learning process.

- Continued self development through faculty development programmes and adequate opportunities for career progression.
- Evincing concern for community and national development through dissemination of knowledge and extension services.
- Inculcation of right industry practices and a global vision in students through guest lectures, industrial visits, in-plant training etc.
- Maintaining a green and serene campus towards nurturing and preserving ecology and environment.

In addition, all efforts are taken to make the students employable and competent in information and communication technology to meet the global demands.

#### Review

Successful implementation of the processes is monitored at various levels by evaluating the students' performance by teachers, teachers' performance by HoD and HoDs'

performance by the Vice principal and Principal. The ISO Auditing and the co-ordination of IQAC in the various monitoring processes also help in the review processes.

The AQAR is also prepared by IQAC, while describing all the events in an academic year, includes also all the proposals for the ensuing academic year.

### 6.2.2 Does the Institute have a perspective plan for development? If so, give the aspects considered for inclusion in the plan.

Yes. The IQAC of the College plays a pivotal role in drawing the Perspective Plan of the College.

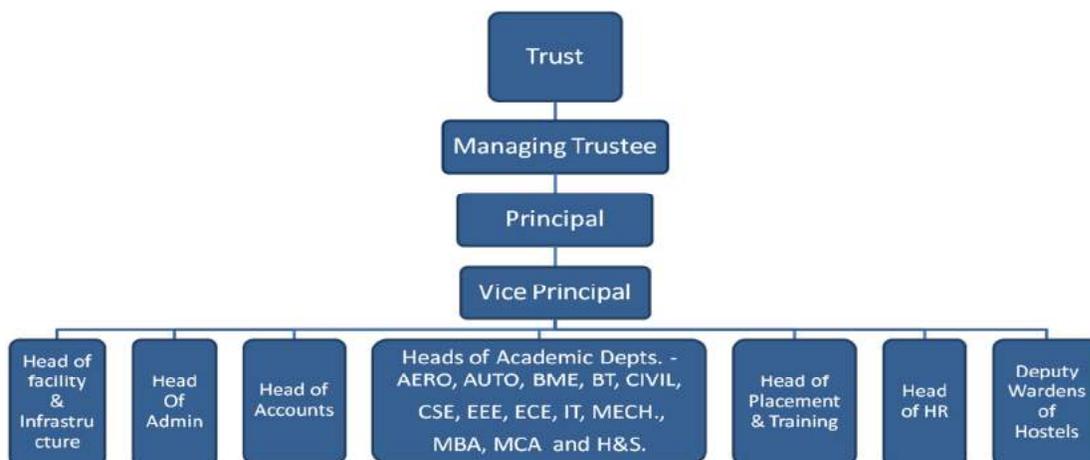
The institution plans the expansion and upgradation of infrastructure, modernization of existing facilities, research and development and adoption of new courses. The Principal and Heads of the departments, plan the academic activities, consultancy, MoUs, Innovations in teaching and learning process etc.

The perspective academic plan is developed by the Principal in consultation with members of the College Development Council, Vice Principal, and Heads of the Departments. Based on this plan, the academic Calendar for every academic year, indicating the academic schedule, is prepared.

After extensive discussions and deliberations at the Department level, at the level of student Council, at the level of different Clubs/Committees and management representatives the Perspective Plan of the College is charted and the same is also submitted to the Management for perusal.

The IQAC of the College is entrusted with the responsibility of implementing the Perspective Plan and also submit the AQARs to NAAC on an annual basis.

### 6.2.3 Describe the internal organizational structure and decision making processes.



#### 6.2.4 Give a broad description of the quality improvement strategies of the institution for each of the following:

The IQAC of the College is highly active and plays a pivotal role in drawing quality strategies as per the Perspective Plan of the College.

- The IQAC of the College is involved in drawing the quality policies for Teaching-Learning, Research, Curriculum planning and implementation, Student activities, innovation and all the extra-curricular and co-curricular activities.
- The IQAC engages itself with various bodies/units in the College to finalize the Perspective Plan and also draws the implementation strategies.
- The Management of the College gives full support to the IQAC in its role in the development of the institution and creating quality culture and consciousness among all the stakeholders.

#### Teaching & Learning:

- Preparation of good visuals for teaching important concepts in subjects like Engineering Graphics, Engineering Metrology, Fluid Mechanics, Applied Thermodynamics, Power Plant Engineering, Electrical Machines etc. to explain the concepts effectively to the students. Micro-teaching methodologies are adopted for certain specific topics. The NPTEL lecture series are also edited suitably and made use of by faculty members.
- A study centre for career guidance and training for competitive examination has been established in the college library and the students are encouraged and motivated to appear for competitive examinations and aptitude tests like GATE, CAT, GMAT, Civil service examination, etc. The study materials are available in the centre.
- Tests for employability in IT is a unique programme offered to the final year students of B.E/B.Tech., wherein students looking for jobs in IT are administered tests and counseling sessions, designed by the HR experts and leading IT companies. Our institution is collaborating with Computer Society of India that offers valuable inputs and support to this unique programme.
- Students are encouraged to present seminars using LCD projector.
- Institute- parent interactive meetings are conducted to discuss the performance of the students for timely action and follow up. Principal, HoDs and Faculty members meet students and parents personally to discuss the progress of the students.
- Student counseling system wherein over 15 students are counseled by a Faculty Counselor in order to motivate, guide and counsel the students periodically.
- Students' attendance and performance are monitored and assessed by an exclusive software developed by in-house software team, viz, CAMS which shows all the pertinent data of the students.

#### Research & Development:

- The institution has Anna University recognized research centres to conduct MS/Ph.D. programmes.
- Allotment of funds for research is planned well in advance and allocated.

- Research and Consultancy Advisory Board is framed to guide research activities.
- Innovative project cell kindles the research instincts and creative thinking in young minds.
- Journals, reference books, internet, lab facilities are made available to staff and students.
- Sponsorship is provided for researchers to visit universities in India and abroad for research.
- Sabbatical leave for Post Doctoral Fellowship scholars.
- Motivation and guidance to apply for funded research projects
- Presently a number of sponsored projects by AICTE, UGC, ICMR etc., to the tune of 269 lakh are being carried out since the last academic year.
- Establishment of research labs like MEMS lab, TIFAC CORE etc.

### **Community Engagement:**

The students of Rajalakshmi Engineering College acquire community service training mainly through National Service Scheme, ENACTUS, Rotaract and Youth Red Cross activities. The main objectives of NSS and YRC are to serve the downtrodden in the society and “Personality Development through community service”. The student members of NSS and YRC teach the community on the importance of rain water harvesting, planting of saplings to maintain a clean and green environment, awareness programmes on AIDS, Health and Hygiene, First Aid, Vaccination and Consumer protection rights.

In addition, they serve the community by organizing Blood Donation camps, free medical checkup, literacy camps and arranging public rallies for creating awareness on themes of societal importance etc. For each association, one senior faculty member is nominated as a program officer. Training programmes are arranged for self-help groups comprising mainly of women and special coaching in Computers, Mathematics and English is also offered to rural children.

The community around is benefited by the medical help extended, by awareness programmes and by literacy camps.

### **Human resource management:**

There is a well organized HR Cell functioning in the College. Additional faculty and staff requirements are planned well in advance by the respective HoDs and submitted to the management through the principal. The HR Cell consolidates all the requirements and sends News Paper advertisements. The applications received by the cell are processed based on the eligibility norms and then sent to the HoDs for short listing. The short listed candidates are then called for an interview by a selection panel consisting of the Chairperson, Principal, HoD and other eminent Professors. A rank list is prepared and appointments are made based on the requirement. Subsequently, every year the faculty appraisal and welfare measures are taken care of by the HR cell.

### Industry interaction

- Signing of MoUs and accreditation by industries
- Reviews of students' projects by industrial experts and their suggestions for improvement are incorporated.
- Experts from industry conduct workshops and training programmes which help the students to learn the current trends in technology which enable them to come out with innovative projects. Faculty who attend sabbatical training in industries share their knowledge and experience with others in the department.

#### 6.2.5 How does the Head of the institution ensure that adequate information (from feedback and personal contacts etc.) is available for the top management and the stakeholders, to review the activities of the institution?

- Principal is both the academic as well as the administrative head of the institution
- The Principal further acts as a bridge between the top management and other stakeholders including the faculty and students.
- The Principal of the college is the Chairperson of all the academic and administrative Committees of the College including the IQAC
- The Principal initiates dialogue and discussion with various stakeholders through different committees, Cells/Clubs/Associations, Alumni and Parents and conveys the management about the feedback, views and sentiments of the stakeholders for effective decision-making. The Principal interacts with Students, Alumni, Employers, Community, Academic peers, Industries and Parents

#### Feedback from students:

- At the end of the semester, for each course, students' feedback is taken in a structured format consisting of 20 major parameters pertaining to teaching- learning process. This feedback is collected by a faculty member, who does not handle the particular class, to ensure free and fair response.
- In the middle of the semester also an on-line feedback is obtained for each course on a seven point format to bring in any mid course correction needed.
- The responses are subject to Data Processing and the results are analysed by the HoDs and the Principal, and the feedback is communicated to the faculty members concerned wherever necessary, for any remedial action and improvement.
- Students' feedback on value added programmes conducted (for example guest lectures, seminars, employability camp, etc.) is obtained at the end of the programme by distributing suitable questionnaire. Based on their response changes necessary in organizing such events are suitably planned.

#### Feedback from Alumni:

- The Placement & Training Cell in co-ordination with the faculty members in charge from each department has been attending to the task of collecting feedback from alumni.

- The departments have created group e-mail ids in which one or two of the faculty members have joined as members. This arrangement facilitates regular interaction with the alumni and helps the department to understand their progress and obtain necessary feedback at the central level. The Placement and Training Officer coordinates the annual alumni meet and alumni association related activities. On the Graduation Day also feedback on the attainment of Programme Educational Objectives and Programme Outcomes is collected from the graduates.

**Employers' feedback:**

- The Director, Training and Placement Cell is continuously in contact with the organizations in which students are placed.
- The feedback is obtained through the telephonic conversation and personal discussion with the HR Personnel and other senior officials of the organization and also through collection of details by sending a structured questionnaire.
- Feedback is also obtained by the alumni from their employers and sent to the departments.

**Community feedback:**

- The NSS Unit of the college has been actively involved in rendering services such as conducting awareness programmes in Environmental Protection, Health, First Aid and General Safety. Further, blood donation camps, literacy camps and teaching computer fundamentals to rural children are some of the other activities.
- The students collect the feedback of the people who make use of such services regarding the help availed by them, suggestion for improvement and scope for expansion. This feedback helps to improve the quality of service in the future camps.

**Feedback from academic peers and industry:**

- The college development council members who are reputed academicians and industrialists give their feedback on the development and quality sustenance of the institution whenever they visit the campus and during CDC meetings.
- Feedback is obtained from industry experts who visit the college to give Guest Lectures, conduct Training Programmes, Workshops etc.

**How are the feedbacks used for significant changes in the curriculum?**

- The feedback from the students helps to understand the merits and weakness if any in the teaching-learning process and to take remedial measures like arranging guest lectures, special classes and industrial visits.
- The feedback from the alumni and employers helps to understand the current industry needs and practices which can be passed on to the students to make them readily employable.

- Community feedback helps to improve and expand the services rendered to the neighbourhood community.
- Feedback from academic peers and industry helps the institution to improve the quality of education and skill impartation and improve the competency level of the students.

#### 6.2.6 How does the management encourage and support involvement of the staff in improving the effectiveness and efficiency of the institutional processes?

- The faculty members are given the facility to post lesson plan, notes on lesson and lab manual in website; Softwares are available to analyze, enter and monitor students' performance; Computer with internet facility is provided and classrooms are ICT enabled.

The faculty members are enabled to participate in and make use of

- Faculty development programmes
- Industrial visits
- Conceptual understanding sessions
- Industrial training
- Various conferences and seminars in the area of specialization
- UGC and AICTE sponsored quality improvement programmes

Faculty members are also encouraged to pursue higher studies through study leave, flexibility in workload and timing, extension of laboratory, internet and library facilities,

Non-teaching staff are given facility to undergo diploma / part time B.E. / B.Tech./ part-time M.E./M.Tech. courses and also specific skill oriented training courses.

Management honours teachers who excel in academic performance; takes care of their general welfare and provide free transport, lunch, crèche facility for the children, loan, PF etc

#### 6.2.7 Enumerate the resolutions made by the Management Council in the last year and the status of implementation of such resolutions.

##### Details of the plans of the institution for 2014-15

- To increase the intake of students in B.E. Mechanical, Civil and BME
- To start new B.E. programme in Mechatronics Engineering
- To procure research centre status for the department of Biomedical Engineering
- To encourage students to carry out Innovative Projects leading to patents and follow up the patents already filed
- To further develop the activities of the National MEMS Design Centre.
- To pursue the preparation and submission of suitable project proposals to UGC with the grant of 12B status to the institution

- To enhance the number of standard Journal publications
- To organize at least one International/ National Conference every year
- To augment the class rooms and lab facilities to accommodate increase in the intake of students and research projects

#### **Status of implementation of resolution**

- An increased intake of 60 students has been added to the Department of Mechanical Engineering and Civil Engineering in the year 2014-15.
- The Department of Biomedical Engineering has been granted the Research Centre status by the Anna University.
- 24 funded projects have been received in 2014-15 from UGC and other funding agencies to the tune of 269 lakhs.
- As part of MEMS activities a National Workshop on MEMS Technology and its application was held during 28-29 Jan 2015.

#### **Academic Achievements:**

Students have been performing well in the Anna University examinations. The batch of students graduated in 2015 has secured 92 university ranks, 65 ranks in U.G. and 27 in P.G. programmes and secured 3 Gold medals in UG and 2 Gold medals in PG; thus topping all the colleges in the tally of Gold medals.

- As a part of TCS 100 Best Initiative, REC has been chosen one of the ‘best 100 institutions’ in the country, for the third consecutive year and J. Jaidev of final year Biotechnology has secured the “Best Student Award” which carries a citation, a medal and a cash award of Rs.10,000/-.
- K. Swathi of Final year IT has won the “Best Developers Award” in the project competition held by Google, during 25<sup>th</sup> & 26<sup>th</sup> June 2014 at San Francisco.
- An Engineering Heritage Centre has been established at REC to showcase the growth of various branches of engineering. The Centre was inaugurated by Dr.A. Sivathanupillai, Managing Director of Brah-Mos Aerospace in November 2014.
- More than 88 papers have been published in reputed international journals and more than 152 papers have been presented in International conferences. Dr.S. Poonkuzhali, R.Kishore Kumar received best paper award for their paper in the international conference in Dubai, UAE in Feb 2015.

#### **Students Technical Competitions and Achievements**

- Students have participated in a number of National level seminars and other Technical competitions and Quiz programmes conducted by other institutions and large number of students have won prizes and awards. A number of students have also undergone several software certification programmes.

#### **6.2.8 Does the affiliating university make a provision for according the status of autonomy to an affiliated institution? If ‘yes’, what are the efforts made by the institution in obtaining autonomy?**

Yes. The institution has already got the approval from UGC for the autonomous status and awaiting the clearance from the affiliating Anna University.

**6.2.9 How does the Institution ensure that grievances / complaints are promptly attended to and resolved effectively? Is there a mechanism to analyse the nature of grievances for promoting better stakeholder relationship?**

Yes. There is a Grievances Redressal Cell which is functioning in the institution to look into the grievances of teaching and non-teaching staff and students.

It consists of Principal, Vice Principal, Director – Management Studies, and a senior professor. Grievances are promptly redressed in several ways. For specific grievances regarding service conditions, salary etc, it is referred to the HR Cell or it may be submitted to the management if necessary.

The students express their grievances, if any, in their class committee meetings and the grievances are addressed promptly and resolved effectively.

More details available in 5.1.10 also

**6.2.10 During the last four years, had there been any instances of court cases filed by and against the institute? Provide details on the issues and decisions of the courts on these?**

There have been no instances of court cases.

**6.2.11 Does the Institution have a mechanism for analyzing student feedback on institutional performance? If ‘yes’, what was the outcome and response of the institution to such an effort?**

Feedback collected for all courses? : Yes / ~~No~~

Specify the feedback collection process :

- A structured proforma consisting of important parameters pertaining to teaching-learning process has been designed for the purpose of collecting students’ feedback.
- The responses are subject to Electronic Data Processing and the results are analysed by the HoDs and the Principal, and the feedback is communicated to the faculty members concerned wherever necessary, for their improvement.
- Students feedback on value added programme conducted (for example guest lectures, seminars, employability camp, etc.) is obtained at the end of the programme by distributing a questionnaire at the end of the event.
- The Director, Training and Placement Cell in co-ordination with the faculty members in charge from each Department has been attending to the task of collecting feedback from alumni.
- The Departments have created group e-mail ids in which two of the faculty members have joined as members. This arrangement facilitates regular interaction with the alumni and helps the department to understand their progress and obtain necessary feedback at the central level. The Placement and Training Officer co-ordinates the activities such as alumni meet alumni association etc.
- Percentage of students participating : 90%

Based on the students feedback

- Management creates additional infrastructure facilities.
- Faculty members are given suggestions to improve the quality of their teaching.
- The programmes that improve the skill of students are organized.
- Certain additional research facilities are created.
- Formation of student activities oriented clubs are initiated (ENACTUS, KRIYA, ATRIUM, STEM, Yazh)

### 6.3 Faculty Empowerment Strategies

#### 6.3.1 What are the efforts made by the institution to enhance the professional development of its teaching and non-teaching staff?

- The College attaches great importance to continuous learning both among the faculty and the students
- The IQAC of the College draws staff development programs based on the curricular requirements, work efficiency, work ethics and new and emerging areas of knowledge and work.
- The individual departments have the absolute autonomy to plan and execute employee development programs in consultation with the Management.
- Any proposal given by the Departments/Cells, IQAC are positively considered by the management for funding.
- The departments are autonomous to have close interaction and participate in the respective Professional society activities such as IEEE, IET, SBC, BRSI and many teachers have won awards from such societies. The faculty members are also given facilities for higher studies.
- The institution guides and helps the non-teaching staff also to pursue their higher studies. They also undergo training in reputed training institutions to improve their skills.
- IBM – Academic Initiative program provided latest technology to the non-teaching staff of Computer Science and Information Technology departments.
- The institution has conducted several staff development programmes for teaching and non-teaching staff. They include programmes on Faculty Development, Personality Development, Skill upgradation, Software Testing Workshops, Training on business application in software, Effective communication skills, to name a few.

#### 6.3.2 What are the strategies adopted by the institution for faculty empowerment through training, retraining and motivating the employees for the roles and responsibility they perform?

- Faculty development programmes.
- Industrial visits by Faculty Members
- Conceptual understanding sessions
- Study leave given for teachers going for higher studies
- Industrial training

- sponsorship for participation and presentation in various conferences and seminars
- AICTE sponsored quality improvement programmes.
- Encouraging staff to pursue higher studies through study leave, flexibility in workload and timing, extension of laboratory, internet and library facilities, special lectures conducted for Junior faculty by experienced senior faculty etc.
- Technical Seminars
- Sabbatical leave for employees doing post doctoral research
- Non-teaching staff doing part time B.E. / B.Tech.
- Training courses for Technical staff.

The contributions by the faculty towards the growth of the institution is duly acknowledged by the management.

For eg: They are appreciated during college day functions. Innovative project cell coordinators are given certificate of appreciation. Promotions and increments are given based on the review of performance appraisal. Refer 6.2.6 also.

**6.3.3 Provide details on the performance appraisal system of the staff to evaluate and ensure that information on multiple activities is appropriately captured and considered for better appraisal.**

The institution / management evaluates teachers based on teaching, research and participation in development activities and due importance is given to all the activities. A structured staff evaluation form is made use of by each faculty member for this purpose wherein he/she gives the details of his/her performance and participation in all the activities assigned to him/her by the department /college. The concerned HoD and Principal give their remarks on the performance of the faculty member. Based on this performance appraisal, the teachers are given promotion, increments and other facilities (perks) and awarded merit certificates and prizes which motivate them to further improve their performance.

Further, higher studies pursued by the faculty, papers published, guidance given to the students in the co curricular and extra-curricular activities and feedback given by students both during the semester and also at the semester end are also appropriately taken in to account during the appraisal.

**6.3.4 What is the outcome of the review of the performance appraisal reports by the management and the major decisions taken? How are they communicated to the appropriate stakeholders?**

The Staff Appraisal method has motivated the faculty to

- Pursue higher studies ( Ph.D. and PDF)
- Publish research papers in reputed journals and books
- Participate and present papers in International and National Seminars, and Conferences in Large numbers
- Submit well prepared Research Proposals for Funding Agencies
- Actively carry out sponsored projects

- Attempt new products and filing patents
- Motivate active participation in all the development programmes.
- Introduce innovations in teaching methodologies.

The staff appraisal method has also proved successful in improving the teaching and learning process. The outcome of the review of the performance appraisal reports are communicated to the appropriate stakeholders through the Head of the concerned Department.

### **6.3.5 What are the welfare schemes available for teaching and non teaching staff? What percentage of staff have availed the benefit of such schemes in the last four years?**

- Sabbatical leave for post doctoral, Ph.D. programmes and industrial training
- On-duty facility for pursuing Ph.D. and to attend training programmes
- Provision for Provident fund
- Loan against salary
- Maternity leave with salary
- Free Medical Aid
- Free transportation is provided to all the teaching and non teaching staff
- Free lunch and refreshment everyday
- Creche facility for the kids
- ATM facility in the campus.

Almost all the staff members avail many of these facilities.

### **6.3.6 What are the measures taken by the Institution for attracting and retaining eminent faculty?**

Measures taken and meticulously implemented for retaining eminent faculty:

- Providing an academic environment conducive for teaching and research
- creating opportunities for organizing or participating curricular, co-curricular, extra-curricular or training and placement activity of interest
- Ensuring job satisfaction by encouraging all the activities resulting in the reputation of the institution
- Systematically conducting annual appraisal, giving due recognition and awards for good performance
- making available a number of staff welfare schemes
- maintaining a good administrative system and of course offering attractive salary

## **6.4 Financial Management and Resource Mobilization**

### **6.4.1 What is the institutional mechanism to monitor effective and efficient use of available financial resources?**

Proper utilization of financial resources are planned at the beginning of every financial year. Finance department takes care of the collection of tuition fees, salary distribution, tax payment, loan distribution, Preparing purchase orders for the laboratory equipment, teaching aids, furniture, and the facilities, payment of bills and maintaining the department budget allocation and expenditure etc. Every financial transaction is recorded. All procedures and dealings are computerized.

**6.4.2 What are the institutional mechanisms for internal and external audit? When was the last audit done and what are the major audit objections? Provide the details on compliance.**

The accounts and procedures of internal control of finance are carried out by the head of the accounts team on a day to day basis and annual audit is done by the statutory auditor. The audit of accounts and submission of income tax returns are being carried out regularly each year.

There are no audit objections since the institution follows a good system of internal controls like calling quotations, comparison of rates, preparation of purchase order etc., and approvals at every stage of such implementation and due verification of goods and services that are obtained after delivery or completion of works. No expenses are incurred without proper approval or sanction by the Head of the institution or HoDs of various departments.

**6.4.3 What are the major sources of institutional receipts/funding and how is the deficit managed? Provide audited income and expenditure statement of academic and administrative activities of the previous four years and the reserve fund/corpus available with Institutions, if any.**

The major receipts are fees collected from students and grants given by the funding agencies apart from bank loans towards creation of infrastructure.

The audited accounts of the Trust which established the institution are enclosed herewith for the required years.

**Refer Annexure -14**

**6.4.4 Give details on the efforts made by the institution in securing additional funding and the utilization of the same (if any)**

Additional funding is sanctioned from research agencies such as UGC, DST, AICTE, DRDO etc for approved project proposals submitted by various departments and MEMS center. These funding enables the purchase of sophisticated equipments, upgrade the labs, establish new research facilities and carry out innovative projects. After the completion of the proposed project utilisation certificates are prepared and submitted to the respective funding agencies.

**6.5 Internal Quality Assurance System (IQAS)**

**6.5.1 Internal Quality Assurance Cell (IQAC)**

**a. Has the institution established an Internal Quality Assurance Cell (IQAC)? If 'yes', what is the institutional policy with regard to quality assurance and how has it contributed in institutionalizing the quality assurance processes?**

Yes. The IQAC of the College was established in May, 2007. The College has submitted all the AQARs to NAAC every year after the implementation of the Perspective Plan.

The Annual Quality Assurance Report (AQAR) of the College appropriately captures the quality policy of the College, strategies adopted and tools and methods followed to implement and institutionalize the quality policies.

- The College believes in continuous improvement.
- The College intends to be a learning organization and believes in organisational learning.
- The College through its IQAC makes concerted and continuous efforts to study, analyse and improvise every strategy, activity, process and procedure in all the domains of the institution with a view to achieve, sustain and enhance quality with a view to achieve excellence.
- The IQAC conducts a host of awareness programs, training programs and orientation programs with a view to imbibe quality among all its stakeholders.
- Continuous feedback, Comprehensive Academic Audit, Feedback from alumni, industry, parents, students, teachers and the community helps it to institutionalize quality culture.

At every stage quality is maintained be it academics, administration, infrastructure etc.

**b. How many decisions of the IQAC have been approved by the management/ authorities for implementation and how many of them were actually implemented?**

All the decisions of the IQAC have been approved by the management and implemented.

**c. Does the IQAC have external members on its committee? If so, mention any significant contribution made by them.**

Yes.

Mr. K. Ramachandran, Head, Micro Initiatives and strategy 361 Degree Minds and Dr. V.Sankara Narayanan, Former, Director, Ramanujan Computing Centre, Anna University, Chennai.

**The significant suggestions made by them are as follows:**

- First year students who find it little difficult to manage the transition in the pattern of teaching and preparation, from +2 to the college, should be identified and given certain special coaching and assignments.
- The institution must take necessary steps to ensure that all the students become eligible for taking the placement.
- A brainstorming session was suggested to discuss the various innovative steps that could be taken in the teaching-learning process and the examination pattern in the autonomous system and the consequent benefits that could be achieved by adopting these steps.
- Conducting job oriented certification courses in collaboration with industries was suggested.
- Every faculty member holding Ph.D. or pursuing Ph.D. should prepare project proposal in his /her specialization and submit to funding agencies.
- Post Ph.D. appraisal should be conducted for faculty members.

- Application should be filed to NACC for reassessment and applying for NABL accreditation for Machine Vision and Department laboratories must be planned.

**d. How do students and alumni contribute to the effective functioning of the IQAC?**

Suggestions from the students through class committee meetings and feedback are discussed in the IQAC for necessary action. Alumni from India and abroad give information on the needs of the industries, skills required, vacancy positions etc., and share their experiences. This is brought to the notice of IQAC and Training and Placement Cell for suitable action.

**e. How does the IQAC communicate and engage staff from different constituents of the institution?**

IQAC has staff representatives from the various departments who actively participate and carry out the decisions made by the IQAC and management. The communication is through circulars, e-mails and meetings organized.

**6.5.2 Does the institution have an integrated framework for Quality assurance of the academic and administrative activities? If 'yes', give details on its operationalisation.**

Yes. The academic and administrative activities are monitored regularly through internal IQAC and ISO audits.

In addition, there are other industry accrediting bodies such as TCS and CTS and inspection by Anna University, NAAC and NBA also help in ensuring quality in academic and administrative activities.

Anna University provides curriculum and syllabi for the courses, pattern of internal examinations, web portal for entering internal marks, passing criteria and calculation of Grade Point Average and Cumulative Grade Point Average. As per the course design, college arranges semester wise / year wise activities and plan for class schedules. Principal and Vice Principal with the support of various committees plan for the activities as listed below:

- Semester/ Annual academic calendar
- Semester wise teaching plan
- Workload plan
- Allocation of resources
- Class time-table
- Examination schedule
- Annual seminar / workshop schedule etc.

**Teaching Learning Process:**

Teaching plans are prepared for a semester. These get verified at different stages in accordance with syllabus and scheme of examination given by Anna University.

The teaching – learning process is facilitated through qualified, trained and experienced faculty. In addition to class-room teaching, students are encouraged to use library and internet facilities.

The faculty members maintain log books and record their daily lectures delivered, lab conducted, unit test papers corrected, evaluated and performance analyzed and special classes arranged based on the results.

The effectiveness of teaching – learning process is reviewed on regular basis. The inputs for such review may be from:

- Students' feedback
- Results of internal tests
- Quality of assignments submitted
- Semester examination results

**6.5.3 Does the institution provide training to its staff for effective implementation of the Quality assurance procedures? If 'yes', give details enumerating its impact.**

Yes. Meetings are conducted to appraise staff members regarding quality assurance procedures and printed brochures are distributed. The system of implementation has improved very much.

Adequate training is given to staff members according to the requirements of AICTE and Anna University. Training is also given as per the feedback taken from the faculty members. The faculty members are trained by ISO to perform internal audits. These training programmes are evaluated for effectiveness at regular intervals.

Sl No	Name of the Programme	Sponsoring Agency	Venue	Date	Name of the Faculty /Department
1	Outcome based Accreditation Process and Parameters for Under Graduate Engineering Programme	NBA, New Delhi	KIIT University, Bhubaneswar	19.05.2012	Dr.Sundaraman/Biotechnology Dr. Yogesh Kumar Sinha/ Aeronautical Engineering
2	New Outcome Based Accreditation	NBA, New Delhi	R.M.K. Engineering College	03.02.2014	Dr. S. Mohamed Yacin, Ph.D Professor and Head, Department of Biomedical Engineering,

**6.5.4 Does the institution undertake Academic Audit or other external review of the academic provisions? If 'yes', how are the outcomes used to improve the institutional activities?**

External review by ISO and the suggestions given are taken into account and the non compliance report is rectified. KPMG, a professional service company has recently reviewed our academic performance and steps are being taken to improve the institutional activities based on their report.

Academic audit is carried out by the Principal and Vice Principal. This audit is done in several stages. All the faculty members submit semester plan for conduct of theory and lab asses to their respective Head of Departments. These plans are periodically

monitored by HODs by checking log books of faculty members. This is done three times in a semester i.e at the end of every internal examination. If syllabus could not be covered as per schedule, the teachers accordingly take extra hours to fulfill the requirements.

More details are given in 6.1.4 also

**6.5.5 How is the internal quality assurance mechanisms aligned with the requirements of the relevant external quality assurance agencies/regulatory authorities?**

- Internal Quality Assurance System is aligned with requirements of external quality assurance agencies in terms of quality of teaching learning process.
- All the necessary support provided to the achievements of students.
- Quality of training programmes offered is frequently assessed.
- Competency in academic and administrative and human resources is maintained.

**6.5.6 What institutional mechanisms are in place to continuously review the teaching learning process? Give details of its structure, methodologies of operations and outcome?**

**The institutional mechanisms are**

- Proper planning of budget for the future semesters resulting in improvement in infrastructure, purchase of equipment, consumables and maintenance.
- Academic calendar prepared well in advance with plans for the whole academic year.
- Recruitment of qualified and dedicated teachers.
- Subject allocation based on the proficiency of the teacher.
- Faculty Preparation programme wherein the teachers prepare systematic lesson plan and organized course material including question bank and get them verified through the subject mentor and subsequently by the Principal/ Vice-Principal.
- Time table framed with hours allotted for library, seminar, tutorials and value added programmes.
- Lesson plan, notes on lesson and question bank posted in website for both theory and lab courses.
- ICT enabled lectures in addition to black board teaching.
- Enriching the curriculum with guest lectures, industrial visits and in-plant training.
- Monitoring of attendance and performance of students through CAMS and SUPER software.
- Effective internal examination and evaluation systems.
- In tune with the outcome based approach, the question papers for the internal tests are framed with a specific pattern which will enable the assessment of the attainment of enlisted Course Outcomes (COs) for each course.
- Entry of marks and attendance in the CAMS software and overall semester wise performance in the SUPER software.
- Prompt communication to parents about their wards' performance and attendance.
- Display of projected internal marks and attendance particulars.
- Feedback received from students during class committee meetings and through structured questionnaires.

- Regular parent- teachers meeting to enable discussion, obtaining feedback and taking improvement measures.
- Remedial measures taken for slow learners and regular absentees.

#### **The Outcomes are**

- REC stands always among the top 5% in the University ranking, among the 500+ engineering colleges in the state, affiliated to Anna University. The number of University ranks has increased to 92 in 2015.
- The institution is certified by ISO for academic excellence.
- Increase in the number of students placed in IT and core companies.
- Increase in success rate among students appearing for competitive exams like GATE/GRE/TOEFL/CAT etc and increase in the number of students going for higher education in India and abroad.

Through regular unit tests, analysis of results of such internal tests and end semester university examinations, feedback obtained from students and parents and companies visiting the institution for campus selection, feedback obtained from the employers on our students performance and ISO audits, the processes are continuously reviewed.

#### **The mechanisms to continuously review the teaching learning process are:**

Principal and HODs of the college evaluates delivery effectiveness of teaching methods. The knowledge absorption and assimilation by students are constantly monitored. Lesson plan and Learning materials are prepared for a semester. These get verified / checked at different stages in accordance with syllabus and scheme of examination given by Anna University. The teaching – learning process is facilitated through qualified, trained and experienced faculty members.

Apart from class-room teaching, students are encouraged to use library and internet facilities. The faculty members maintain logbook and record daily instruction delivered, practical classes conducted and other such activities performed. This is also entered in the college internal database system CAMS. The effectiveness of teaching – learning process is reviewed on regular basis. Two feedbacks in a semester is taken from students and necessary changes/improvements as per the feedback is implemented. Feedbacks are reviewed by HOD/Principal for the concerned teaching faculty and feedback communicated. The concerned faculty then plans for improvements which are monitored on a regular basis for their effectiveness.

#### **6.5.7 How does the institution communicate its quality assurance policies, mechanisms and outcomes to the various internal and external stakeholders?**

The communication is through websites, meetings organized with internal and external stakeholders, circulars, newsletters, college magazines and newspaper advertisements.

Through consistent efforts, the institution strives for continuous improvement in all its activities leading to substantial enhancement in Quality Management Systems.

## CRITERION VII INNOVATIONS AND BEST PRACTICES

### 7.1 Environment Consciousness

#### 7.1.1 Does the Institute conduct a Green Audit of its campus and facilities?

- Green audit of the institute is conducted annually by the Biotechnology, and Civil Engineering section of the Estate Maintenance Department.
- Recycled water is utilized for maintaining green campus.
- Rain water harvesting is done in all the buildings.
- Dried leaves are used as a mulch.
- Solid waste management is done through dumping in nearby compost pit.
- Tyre pyrolysis is done to produce biodiesel.
- Use of solar energy initiatives for lighting the campus.
- Vapour compression heat pumps have been installed to provide hot water for the hostel inmates which reduces the energy required by 1/4 for heating. Due to this installation, the expected pay back period of three years has already been achieved.

#### 7.1.2 What are the initiatives taken by the college to make the campus eco-friendly?

##### **Energy conservation**

- The Classrooms in the College are provided with large windows to allow natural light, hence the classrooms have good ventilation and light, thus usage of electric lights are minimized.
- Waste bins are kept at strategic locations and segregation of waste is consistently done. The bio-degradable material is put into the compost pit along with the foliage and leftover food and the same is used for composting. Recyclable material is sent for recycling. Thus maintaining the campus clean and green.
- RO plants are set up for clean and potable water and the grey water is sent for recycling and reused for watering the garden.
- Drain pits are used to sink the water and recharge the ground water table.

##### **Use of renewable energy**

- To create awareness on renewable energy the college organizes hands on training, workshops and seminars.
- Tyre pyrolysis to yield biodiesel, a research project was funded by the Ministry of Forest and Environment.
- Solar powered refrigerator, an innovative project won the consolation prize in National Innovation Foundation NIF contest in 2009.
- Solar powered dish washer and solar powered cars are the other projects involving renewable energy.
- The college is using solar powered heaters which have been installed in the boys' hostel and there is a proposal to have a biogas plant in the campus from sewage generated in the hostels.
- Research on biodiesel from plant sources is also being carried out.

## 1. Solid waste management facility:

### Existing arrangement:

Solid wastes are collected daily and dumped alternatively in two pits excavated in a corner inside the campus area and allowed to decompose. At a later date, this is dug out and used as manure for gardening.

### Proposed arrangement:

Solid waste metal tanker will be placed in selected locations and solid waste collected will be dumped in the tank for decomposition. After two months the waste will be taken out and used as manure.

**Plastic water bottles are being used for construction of earthquake resistant small structures in the campus.**

## 2. Waste Water Management:

### Existing Arrangement:

Waste water is collected in separate tanks constructed separately for each block. The tanks are emptied and the wastewater is treated through sewage treatment plant established at a cost of Rs.70 lakhs and the treated water is re-cycled for gardening.

### Sewage treatment plant



### Water harvesting.

#### Existing Arrangements:

All the buildings have rainwater-harvesting structure and the rainwater is allowed to go underground through the structures. The runoff water collected on the roads is drained and conveyed to a pond for giving recharge to the bore well sources located inside the campus.

#### Check dam construction

Culverts are built by the institution to prevent the overflow of water from the lake near the college, during the rainy seasons.

**Efforts for Carbon neutrality**

The net zero carbon foot print is achieved in the campus mainly through planting trees and steps are taken to conserve energy. The college is a beautiful serene campus full of greenery which improves the aesthetics, reduces global warming and green house effects. They provide shade in summer and act as wind breakers in winter season. It minimizes the use of air conditioners, fans and heaters. Trees are effective cleansers and remove pollutants from air and soil, thus minimizing the carbon footprint and around 1550 trees have been planted in the REC campus so far.

**Plantation :**

When the college was built, care was taken not to chop down the old, large trees, and they were integrated into the college as a part of the campus, and stand tall even today. In addition to this, the college also maintains a variety of on-campus plant life, both potted and otherwise, keeping the campus cool even in the summer heat. The college maintains botanical and herbal gardens where plants are grown. In support of the environment, guests to the college are gifted ornamental potted plants grown in these gardens, as opposed to flowers cut from plants. Herbal Garden is maintained by the Department of Biotechnology which conducts research on phytoremediation – consisting of mitigating pollutant concentrations in contaminated soils, water or air, using plants which can degrade, or eliminate metals, pesticides, solvents, explosives, crude oil and its derivatives, and various other contaminants from the media that contain them. They help in the reduction of global warming and provide shade in summer.

**Hazardous waste management:**

Hazardous Chemicals are kept separately in the store room away from the reach of students. Lab In-charge takes care of the chemicals and safety norms in the laboratory are strictly followed. Students are made aware of the hazardous chemicals and safety aspects when they are given instructions before utilizing the chemicals.

The labs are well ventilated and spacious and equipped with exhausts. 24 hour water supply is available in Biotechnology & Chemistry labs and safety of the students is given top priority in planning a facility. Posters are also displayed in the labs.

**e -waste management:**

The e-waste generated is given to the authorized dealers who purchase the scrap and reuse the useful components. Apart from this, the electronic and electrical instruments under repair are given to the students during the lab sessions to dismantle and reassemble, which helps application oriented learning. Guest lectures on hazardous management of electronic wastes are arranged. News paper cuttings of hazards of e-wastes are also frequently displayed in the Notice Boards.

## 7.2 Innovations

### 7.2.1 Give details of innovations introduced during the last four years which have created a positive impact on the functioning of the college.

#### **‘Outcome based approach’ in teaching and evaluation**

The pass percentage and placement of students have been used as measures of performance and grading of engineering institutions currently. However, these parameters are not fully indicative of the theoretical and practical knowledge gained by the students and their preparedness for taking an employment in the industrial sectors. Hence, these factors may not completely indicate the attainment of the stated vision and mission of the institution.

Further, in the context of advancing technology and renewed requirements of the graduating students, it has become essential to have a relook in to the various other contributing factors. This has led to an “outcome based approach” to be followed in the educational system and the national level accreditation has assumed a great significance. So, a careful study of the content of the curriculum and syllabi of all the UG programs offered by our institution has been made and a set of Program Educational Objectives (PEOs), Program Outcomes (POs) and Course Outcomes (COs) have been diligently framed for each program. These documents are disseminated to the stakeholders through college websites, brochures and other relevant documents.

In this exercise, quantitative assessment of attainment of these outcomes is carried out periodically. It includes direct methods comprising of academic performance and placement records and indirect methods such as feedback obtained from various stakeholders. These assessments have been used as real performance indicators of the success of the programs in turning out graduates ready for employment or higher education.

#### **Content beyond curriculum and Value Addition Programs**

The affiliating university revises the curriculum and syllabi of the courses offered by the institutions only once in four years. However, as stated earlier, since every field of engineering and technology is rapidly advancing and new concepts and process are evolving, it becomes essential that the students are given an exposure on these advancements, apart from learning the prescribed curricular content. In view of this, the teachers handling the various courses make a careful study of the concerned subject and the prescribed syllabi and decide upon the additional topics to be taught in the class rooms and supplementary experiments to be demonstrated in the laboratories to enable the students to update their knowledge on the subjects. Thus for every course, the content beyond curriculum to be covered are listed in the lesson plan for every subject in the beginning of the semester itself. The usefulness of such coverage is also assessed at the end of the semester.

Attainment of outcomes of all the courses contributes to the attainment of majority of the program outcomes. However, there will always be gap to be filled in any curriculum to meet all the program outcomes. These gaps are identified and necessary value addition

programs are offered through a dedicated training department which works in tandem with the academic departments.

### **Fostering Students' Innovative Ideas**

#### **A.P.J. Abdul Kalam Innovative Project Cell**

There is an active Innovative Project Cell functioning in the college to motivate the students to carryout innovative projects which can be either their respective program oriented or interdisciplinary. All the laboratory facilities are made available to the student groups and necessary guidance is also given to proceed with the proposed projects. All the completed projects are examined by a team of faculty members and the short listed ones are presented in inter-departmental competition iQUEST, arranged for this purpose in the presence of external subject experts. The final three selected projects and three best projects from each department are given certificates and awards during the college day. Viable projects are supported for fabrication, testing and also for patenting.

#### **Core skill design contests**

In order to inspire the students to acquire core skill competencies and team spirit in their respective specialization and allied areas, project design contests are also conducted, grouping the various programs offered by the institution in to three broad areas namely:

- A) Engineering Design [Aeronautical Engineering, Automobile Engineering, Civil Engineering and Mechanical Engineering]
- B) Circuit design [Electrical and Electronics Engineering, Electronics and Communication Engineering and Biomedical Engineering]
- C) Computer programming [Computer Science and Engineering, Information Technology]

After a close scrutiny of the projects submitted by the student groups, awards are given to the teams securing first three places in the College Day Function. Such contests have been found to enhance interdepartmental activities and interdisciplinary projects.

### **STEM**

Science Technology Engineering and Mathematics (STEM) is a Club entirely managed by the students which conducts weekly laboratory programs in circuit branch subjects aiming at practical skill up gradation of junior students through experimentation. This effort has enabled the juniors to strengthen their theoretical concepts learnt in the class rooms, get hands on experience in handling hardware components, gain confidence in the fabrication of simple circuits and systems and carrying on with their regular practical laboratory classes.

### **Department Advisory Board (DAB)**

Every department has formed an Advisory Board to guide the department in the outcome based approach in teaching and evaluation. This board consists of Head of the

Department, one or two senior faculty members, alumni representatives and external experts from industries and educational institutions as members. The board studies the curriculum, syllabi, feedback obtained from the stake holders and suitably frames the course outcomes and program outcomes in tune with the stated vision and mission of the department. Thus with the suggestions from respective boards, the departments efficiently plan and execute the curricular and co-curricular activities.

#### **Mid semester online feedback**

Apart from the written feedback obtained from the students on each course at the end of the semester, a mid semester feedback is also collected through online on a questionnaire containing seven points on the nature of course delivery. These feedbacks are consolidated, analyzed and corrective action is taken wherever needed for improving the student learning of the subjects being taught. Because this online feedback is obtained in the middle of the semester itself, there is time for implementing the corrective action.

#### **Knowledge Management Cell (KMC)**

Realizing the need for faculty members to update the knowledge in their respective fields of specialization, it is insisted that they should make use of the faculty development programs/ workshops/ seminars arranged by other institutions also in the relevant fields. The faculty members apply through the Knowledge Management Cell functioning in the college and seek approval and financial assistance for attending such programs. This cell also maintains a record of the proceedings of such programs for the benefit of other faculty members interested in these topics. On the average about 300 applications are processed through KMC and recommended for sponsorship every year.

#### **Monthly review of academic progress**

To closely monitor the progress of the teaching learning process and the performance of the students in the internal examinations, a suitable format has been prepared in which each faculty submits a monthly report, indicating the portions covered in each of the theory courses, status of completion of laboratory experiments and comments on lab viva practices, number of hours taken for the courses, deviations from the lesson plan with respect to topics/periods if any, percentage pass in the internal examination in each of the courses, CAMS entries made, maintenance of attendance registers and counseling books and corrective measures taken for slow learners. This format clearly indicates any further steps to be planned and executed for successful completion of the courses in the semester.

#### **Higher Education Fair**

Every year, during the beginning of the academic session, a comprehensive database of Second, Third and Final year students interested in higher education is collected using the College Intranet. Familiarization programmes on higher education are held with the help of experts from Gate Forum; United States- India Educational Foundation, Chennai; British Council, Chennai and other private organizations dealing with International Degree Pathways (IDP). Guidance is also given to the students to take up Civil Service Examinations after the B.E./B.Tech. Programmes. Special lectures by higher educational administrators from Universities abroad are also arranged. Such programmes enable the

students to suitably plan their higher studies, even during the initial years of the under graduate course.

### **Centre for Fostering Social Responsibility**

Through our Centre for Fostering Social Responsibility, our students and faculty members are actively participating in different community development projects, ranging from Green Campus project to Swatch Bharat Abhiyan.

### **Entrepreneurship Development Cell (EDC)**

Entrepreneurship Development Cell, named as “Kriya” is functioning in the college which aims to develop students across various socio economic backgrounds and to empower them with the skill sets for becoming an entrepreneur and also provide real life exposure in running such ventures. Towards this aim, the cell organizes several events every academic year on intricacies of Entrepreneurship, Business Strategies and Venture Capitalist Approaches. Steps are also taken periodically to expand the existing business ventures to deal with increased number of salable consumable products.

### **ENACTUS**

ENACTUS is another forum in the college through which REC students in collaboration with social service organizations, work towards the ultimate goal of creating employment and poverty alleviation among the under privileged section of the society, thus setting up a sustainable business that would generate a continuous income for them. Some of the successful projects carried out by Enactus are PARISUTHAM- manufacturing cleaning aids, DHANIYAM- initiative to promote healthy living by preparing millet based food products, KAIVANNAM- bringing out the incredible India by showcasing the artistic skills on fabric materials and AVANTIK- restoring conventional methods of agriculture in our lands.

## **7.3 Practice I:**

### **1. Title of the Practice**

Efficient implementation of curriculum for fostering effective knowledge transfer

### **2. Goals**

- To ensure that courses offered to students are allotted to competent faculty members who have adequate expertise and experience to teach the course and to appoint a mentor for each course.
- To ensure that the faculty member, well ahead of the beginning of the semester, prepare a set of course objectives and outcomes, adequate study material, presentation material, videos, software tools, lesson plan, question bank with key under the guidance of the mentor and get approved by HOD/Principal.
- To monitor course delivery continuously during the progress of the semester, based on the feedback/input given by the stake holders.
- To put a system in place for measuring the attainment of the intended course outcomes quantitatively for each course.

- To record and make available the experience and hurdles faced by the faculty in delivering the course, to the faculty who will be teaching the course in the subsequent years.

### 3. The Context

In any higher educational institution, knowledge transfer is one of the most important areas to be focused. In this context, establishing a robust system to scientifically define the outcomes that are to be achieved, developing processes to transfer the knowledge and measuring the attainment of the outcomes quantitatively are followed periodically. Appropriate steps are taken for continuous improvement which is very essential.

### 4. The Practice

A skill matrix is prepared taking into account faculty specialization, performance of the faculty in the last two years and professional experience. From the skill matrix, appropriate faculty is identified for teaching each course. The faculty with vast teaching experience and expertise is identified as a mentor for the course. Mentor of a particular course guides the faculty members in defining the course objectives and course outcomes based on the syllabus and assist them in preparing lesson plan, notes on lesson and other adequate study material, presentation material, videos, software tools and question bank with key. Well ahead of the beginning of the semester, it is ensured that teachers of all the courses offered are well equipped to handle the courses assigned to them.

As the semester progresses, courses are delivered as per the lesson plan prepared. Periodically the mentor of a particular course and the course coordinator interact with the faculty offering the course and ensure that the delivery is in line with the lesson plan. In case of any deviation, suitable measures are taken to bring it in line with the lesson plan. The last Saturday of every month the HOD reviews the progress of the course delivery.

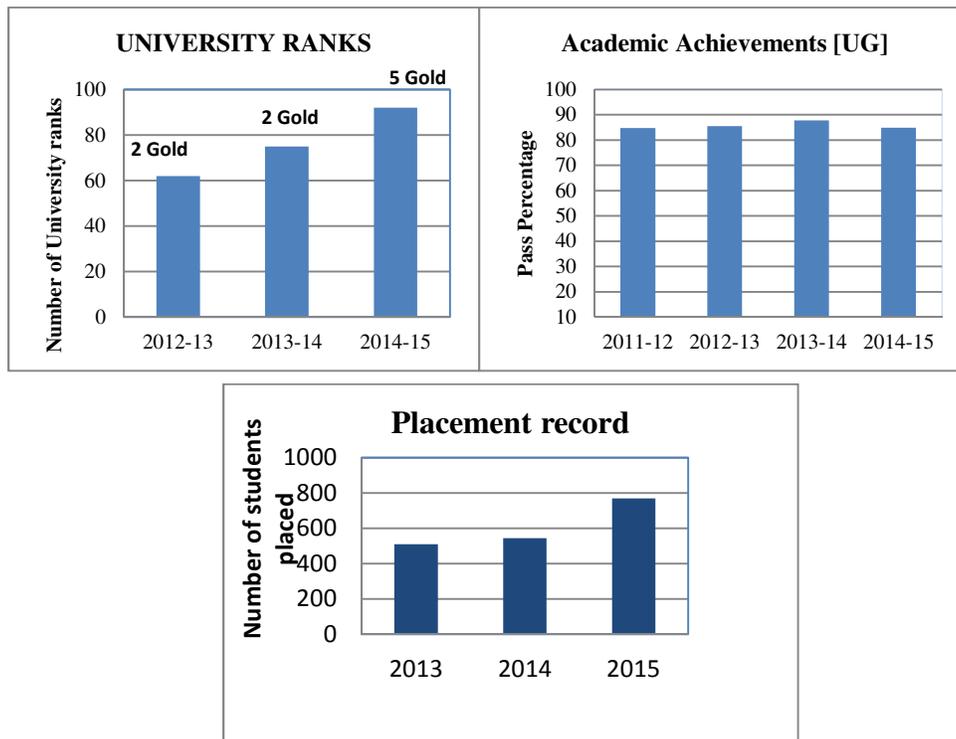
To ensure the quality and effectiveness of the course delivery, periodic feedback is collected and appropriate measures are taken as detailed below:

1. Feedback from the students collected in the Class Committee meeting arranged after the first and second internal assessment tests (Unit tests).
2. Online feedback is taken from the students on the teaching of every course between 6<sup>th</sup> and 8<sup>th</sup> week from the start of the semester.
3. Once in a semester, general counseling is arranged. During general counseling, each student is counseled by a senior faculty belonging to any other department so that, the student feels free to express his difficulties and issues concerning the teaching learning process.
4. Once in a semester a parent teacher meeting is arranged to get parents' views also. For all the concerns raised appropriate actions are taken. Performance of the students in the internal assessment tests is taken as an indicator of attainment of course outcome. In this regard, the weightage given for different course outcomes and the performance of the individual students in each course outcome are evaluated and quantitative assessment of attainment of course outcome is made

after every assessment tests. It serves as guideline to make sure whether the intended outcomes are achieved or not. Wherever the attainment is low, appropriate corrective measures are taken. At the end of the semester, the teacher prepares a comprehensive end semester course review form which provides input for the teachers who will be handling the same course in the next term.

## 5. Evidence of Success:

The following figures indicate that the overall improvement in the number of University ranks and placement of students with consistent pass percentage are achieved, even with increasing number of graduates year after year.



## 6. Problems Encountered and Resources Required:

A great deal of time is to be set apart by all the faculty members in monitoring, assessment and relevant documentation, apart from the time spent for the class room teaching.

### Contact Details

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Name of the Institution	:	Rajalakshmi Engineering College
City	:	Chennai
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Accredited Status	:	Yes
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### 7.3 Practice II:

#### 1. Title of the Practice

Research and Consultancy Advisory Board for nurturing knowledge creation

#### 2. Goal

- To motivate students and faculty members to actively participate in research in their field of interest resulting in publications, product/system development, process innovation leading to patenting.
- To put a system in place to guide the faculty to prepare and submit proposals for funding from external agencies.
- To encourage faculty to enhance their qualification so that, every programme has large percentage of Doctoral/Post Doctoral degree holders.

#### 3. Context

In any higher educational institution, knowledge creation is as important as that of knowledge transfer. This could be achieved, only by enabling the researchers to stay focused on their core work with a support system helping them to acquire the necessary funding, to procure the required facilities and dedicate adequate time for their research activities. In this context, the support system should also provide guidance for the researchers in preparing suitable project proposals.

#### 4. Practice

To provide an organized support in the context mentioned earlier, a Research and Consultancy Advisory Board (RCAB) has been constituted by the college with a vision of

**“Establishing a research ambience that facilitates the development of new creative research areas of Global importance in REC”.**

The activities pursued are:

- Identification of potential researchers.
- Encouraging them to plan and prepare proposals in the field of their interest.
- Examining the proposals for its current relevance in knowledge creation, innovation and societal benefit.
- Researchers who have submitted proposals showing promising outcomes are guided to prepare detailed proposals.
- Proposals are examined thoroughly and grouped in two categories
- Projects that could be carried on with available facilities
- Projects requiring substantial additional funding for creation of new facilities.

If the project does not require additional facilities, researchers concerned are encouraged to start the work immediately for which necessary guidance and monitoring is provided.

If the project requires additional facilities, the funding agency relevant to the topic concerned is identified and the researchers concerned are guided to prepare a proposal as per the requirement of the specific funding agency. This proposal is vetted by the experts

working in the areas and submitted to the agency. The research team is guided to get more insight into the topic so that they are better prepared to present the proposal to the funding agency.

Once funding is received all the necessary assistance and monitoring are provided so that the project progresses as per the original plan.

### 5. Evidence of Success:

S. No.	Academic Year	No of funded projects	Amount received (Rs. Lakhs)
1	2010-11	3	24.50
2	2011-12	4	24.60
3	2012-13	2	41.62
4	2013-14	5	110.64
5	2014-15	24	256.85

The steady increase in the number of funded projects and research grant received indicates the efficacy of the practice followed by RCAB.

### 6. Problems encountered and Resources Required:

- Identifying problems that lead to solution/products for societal cause
- Challenges faced while implementing some of the abstract theoretical ideas into actual practice
- In many projects, several government/non-government bodies are involved. Meeting the requirement of these bodies within the deadline is a real challenge.
- Panel of experts in very wide areas of specialization is required.
- Specific and sophisticated facilities are required for many projects.

### 7. Notes (Optional):

The research team carrying out the projects also helps to strengthen the UG/PG programmes in terms of taking up suitable projects in their curriculum and also creating working models for demonstrating certain advanced concepts in the relevant areas.

#### Contact Details

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## POST ASSESSMENT INITIATIVES

Rajalakshmi Engineering College affiliated to Anna University, Chennai is a premier institution in Engineering, Technology, Management Education and Research. The institution was accredited by NAAC for the first time in March 2007 and subsequently reaccredited in October 2013. We strive to continuously improve and sustain quality in all the aspects of education. Constant self improvement has helped us to maintain the reputation of the college as a leading institution which focuses on achieving the goals towards attainment of our mission and vision. The Governing Council, College Development Council, IQAC, Principal, the teaching fraternity, administration, the various departments, students and other stake holders jointly contribute towards making the college an institution pursuing excellence.

### Curricular Aspects

Since the last reaccreditation in 2013, one UG programme on **Mechatronics** was introduced and the department of Bio medical Engineering has been recognized as **research centre for carrying out MS/PhD** programmes. The student strength in UG and PG programmes has increased from **2680 in the academic year 2006-07 to 5927 in the year 2015-16**. The quality of the students seeking admission has seen a significant improvement, due to the sustained efforts taken by the college in maintaining high standards in all the academic activities. Though the curriculum is designed by Anna University, it is enriched by organizing course relevant guest lectures, training programmes, industrial visits, and international certification programmes on current topics of importance, to make the students globally competent and obtain placement in reputed organizations. Employability training camps, value added programmes and online aptitude tests are also conducted to enhance the employment potential of the students.

In the last two years, objectives of the various programmes (POs) have also been suitably framed to be in alignment with the Vision and Mission of the respective departments and also ultimately reflecting those of the institution. Like wise, objectives for each course (COs) in the curriculum have also been identified, one for each of the five units in the syllabus. Clear **procedures have also been set for the assessment of the POs and COs**, including the setting of the questions under each unit covered, for the internal tests; preparation of appropriate questionnaire for obtaining feedback on the COs for each course from the present students at the end of the semester and on the POs from the students at the end of the program.

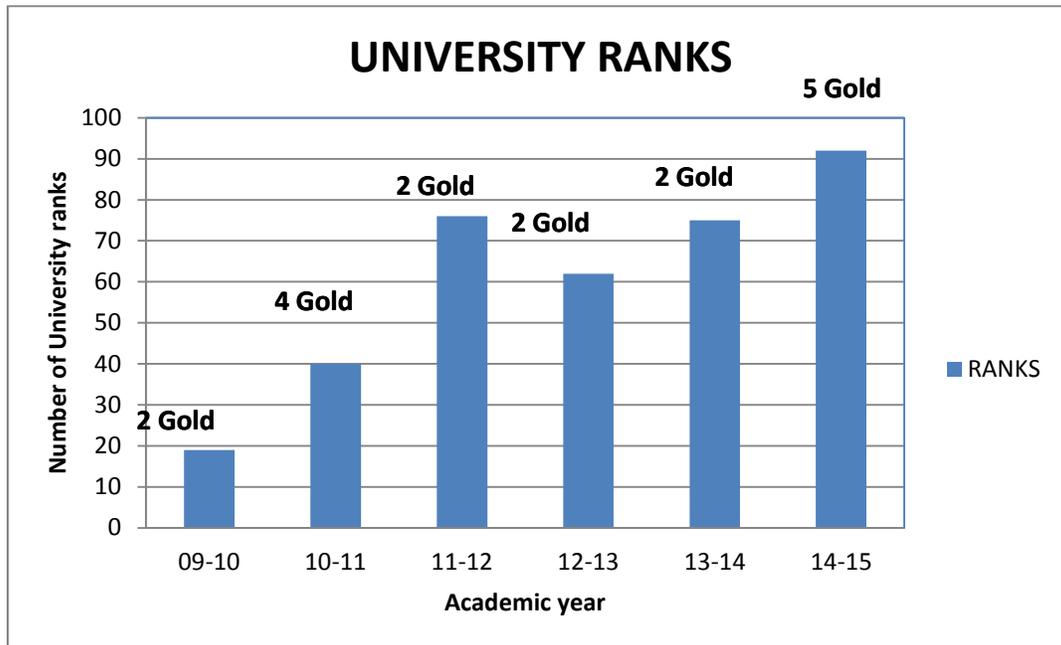
### Teaching, Learning and Evaluation

Qualified and committed teachers are appointed through a well designed recruitment procedure, a good number of them being University rank holders in their degree programs. Encouraging the faculty members to enhance their qualification, has resulted in the number of Ph.D. holders in the campus increasing from **17 in 2007 to 72 in 2015**. The preparation of academic calendar has been further improved in the last three years by including the scheduling of class tests of short duration. Subject allotment is based on the competency matrix and experience of the teacher.

Monitoring of the teaching – learning process through monthly review and modification of the **CAMs software** for entering the marks obtained by the students in the various tests and assignments, for computerized evaluation of the attainment of the COs are the recent additions. Posting of lesson plan, notes on lesson, lab manuals **using Moodle software, use of NPTEL lectures, and classle.net**, also facilitate effective Teaching-Learning and Evaluation processes. REC is also a local chapter providing facility for faculty and students to register and undergo specific courses of interest offered in a specified period and can take up a written examination and earn certificates of proficiency. One of our teachers of ECE department, Ms. Sheena Christabel has recently undergone a course on Signal and Systems and secured an All India top rank in the NPTEL examination conducted for the course. The college is also an active center, taking part in the Webinar series of lectures conducted by IIT Bombay on curriculum oriented topics, in which teachers participate and extensively make use of them in class room teaching. Periodical training is also arranged for laboratory technical staff, so that they are enabled to assist students in the laboratory work and project activities.

The college has instituted several awards and prizes, free ships and scholarships to the deserving students. It organizes training programmes like **Wipro Mission 10X, programmes by IBM, refresher courses and orientation programmes to upgrade the skills of the teachers**. Eminent senior faculty members with rich experience in teaching, research and administration are appointed to hold key positions in the organization. Great academicians and renowned industry personnel visit the campus on a regular basis to enlighten the faculty and students on the current trends and developments in the various areas of engineering, technology and management. **An on-line feedback on each course**, based on seven point questionnaire is also obtained from each student during the middle of the semester, so that corrective measures, if needed, can be implemented for the benefit of the students. The college caters to the diverse needs of the physically challenged, lateral entry students, students in need of counseling and advanced learners etc.

All encouragement is given to high level performers, for further enhancing their achievements and for taking up innovative projects through the **Innovative Project Cell** of the college. Students interested in higher studies are also given appropriate guidance and support by way of individual counseling through higher education fair arranged every year. Last year the administrators of the college introduce an initiative termed as **“Academic Guardian Duty”** wherein teachers monitor the late evening study hours of the hostel students and help them in their academics. These efforts have shown consistent and marked improvement in the pass percentage as well as the number of **University Ranks in UG and PG programmes (7 in 2007 to 92 in 2015 including 5 gold medals)**.



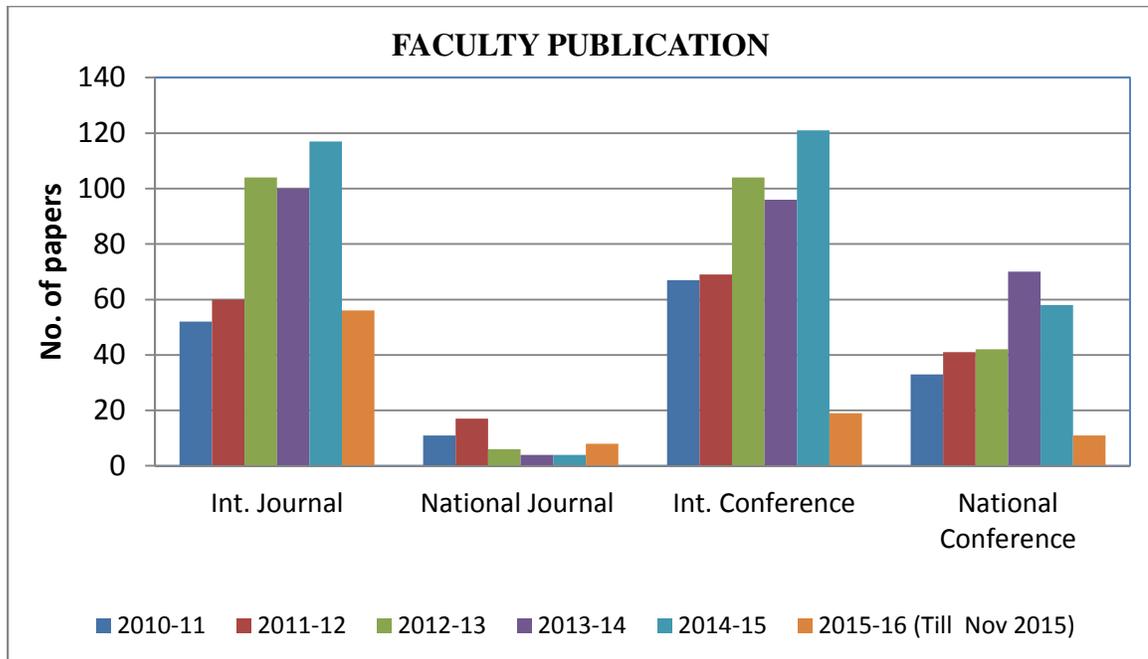
From the academic year 2011-12 onwards, a systematic procedure has been evolved to review the overall performance of the departments annually. For this purpose a specific format has been framed enlisting the various aspects covering the teaching learning process, university examination results, FDPs, guest lectures industrial visits, students' and faculty achievements, R&D activities, projects carried out, consultancy work, paper publication etc., In a meeting with the Chairperson, Advisor and Principal, the departments present their performance in these areas and also their plan of the activities for the ensuing academic year. The committee holds an elaborate discussion on the presentation and suggests suitable remedial measures.

### Research, Consultancy and Extension

The management has well defined R&D initiatives. The Research Advisory Board (RAB) in the college has been renamed as **Research and Consultancy Advisory Board (RCAB)** to lay further stress on consultancy activities. This Board functions under the chairmanship of Prof. C. R. Muthukrishnan, Advisor to guide and monitor the research and consultancy activities in the campus. This has resulted in securing a number of externally funded projects and also in the establishment of research labs in emerging areas, publication of research papers, submission of proposals to funding agencies and obtaining management support to faculty and students for in-house and innovative projects.

After the peer team visit in 2013, **funded research projects** for a total amount of **Rs.425.53 lakh** have been sanctioned including a project on "Fabrication of Low cost MEMS" for **124.56 lakh** by DST-TSDP and number of other projects by AICTE, and ICMR. A state-of-the-art '**clean room**' is also being created with Class 1000 and 10,000 specifications at a cost of Rs. 45 lakh in the college, enhancing semi conductor fabrication and embossing techniques.

The number of **faculty pursuing research presently is 116** and a good number of them are on the final stage of submitting their theses. Nine departments are recognized as research centres by the affiliating Anna University to conduct M.S./Ph.D. programmes. So far **51 scholars have registered in these research centres for their Ph.D. and there are 25 faculty members, recognized by the university as supervisors for guiding Ph.D. scholars.** The number of publications in International journals with good Impact Factor is also on the increase in the last two years. Faculty members are also invited to deliver expert lectures and to chair international conferences.



Consultancy services are rendered by the experienced faculty and the research findings and technology developed are transferred to industrial practices, wherever applicable. **An International Journal on ‘Global Business Management and Research’ is published by the Department of Management Studies** which has national and international scholars in its editorial and advisory board. REC has won many accolades from the Government of India. **The Department of Science and Technology, GOI sanctioned TIFAC CORE in Machine Vision with an outlay of 5.15 crores** which caters to the needs of nearby industries, has carried out enormous R & D work in the field of Machine Vision and offered expert consultancy to a number of industries.

Professional Society activities at the National and International levels have gained momentum. Teachers and students are the active members of IET, UK, IEEE, ACM, ISTE, CSI, SBC, ASI, BRSI, SBT, ASME and ISHRAE etc. Many technical events and conferences are organized in collaboration with these societies benefiting the student community.

Encouraged by the management, the students faculty are involved in community services through **NSS, YRC, SIFE (ENACTUS) and Rotaract Club, organizing Blood Donation Camps and Health Awareness programmes, Literacy Camps, Environmental Protection and others. Sweet life, Mileage of Autopreneurship, T shirt program and Garbage Gambit** are the other outcomes benefiting the society including relief measures during Chennai floods in Dec 2015.



and

*REC SIFE TEAM*

### **Infrastructure and Learning Resources**

The college has been upgrading the infrastructure facilities year by year, to meet the needs of the commencement of new programs and increasing student intake. New academic blocks, classrooms, labs, staff cabins and acoustically designed seminar halls have been built. A new hostel with eight floors and dining halls has also been constructed. Accommodation is also provided in the hostel for faculty who want to stay residentially.

The internet connectivity has been increased from **1 MBPS to 116 MBPS**, 100 MBPS provided by Reliance and 16 MBPS from Vodafone. All the staff members are provided computers with internet connectivity. The campus is wi-fi enabled. There are number of new softwares purchased and also developed indigenously to enable efficient planning and operation of the various academic and administrative processes and increasing the use of e-governance. The library services are fully computerized with adequate number of books and journals, and e-journals are subscribed for online access. As recommended by the peer team committee, the college has subscribed to a number of international journals. Well laid roads, lush green campus, ICT enabled well ventilated classrooms; well equipped labs provide an ambience conducive for active learning.

**Sir C.V. Raman Heritage Centre** has been established in Sept. 2014, housing a museum wherein models and posters depicting the course of development in various fields of engineering and technology and also a seminar hall to project videos of such innovations and advancements are available.



The college stresses on the need of physical fitness of emerging engineering graduates. The sports ground is given a new look with renovated Basketball court, Tennis and Volley ball courts, in addition to the already well laid out existing play ground for cricket, football, throw ball and athletics.

A new **Health Centre** with increased space and improved amenities has been built. It has a full time doctor and trained attendant which provides all the basic facilities to meet any emergency. A creche facility is also provided.

A nationalized bank has also come up adjacent to the college entrance and ATM facility is available inside the campus.

### **Students' Placement**

The full fledged placement and training cell takes initiatives in improving Industry – Institute relationship by signing MoUs. Several reputed companies have accredited the college and offered a variety of Value Added Programmes to improve the proficiency of the engineering students. The campus placement figures show the commitment of the active placement cell (510 in 2013 to 771 so far in 2015- 16). The cell also organizes career guidance programmes and education fairs to guide students interested in pursuing higher studies.



**Employability training camp in progress**

### **Student Support and Progression**

On comparing the admissions with the other colleges in the neighborhood and based on the marks at the entry level, the quality of the admission has seen a significant improvement. Students are encouraged to participate in sports, co-curricular and extra-curricular activities. Equal prize money scheme exists. **The best outgoing student award, Prof.V.N.Srinivasan award for the best innovative project, cash prize for final semester project for all the departments, awards for rank holders in various semesters, kits and incentives for sports personnel, waiver of tuition and transport fee for the deserving students** are some of the other initiatives to motivate and support the students. Apart from the regular teaching-learning process, bridge courses, communication skill programmes and remedial classes are conducted for the slow learners.

The **Innovative Project Cell** and **Entrepreneurship Development Cell-KRIYA (EDC)** are platforms to mould the research and entrepreneurship skills respectively. EDC has recently **received a grant of Rs. 7 lakhs from AICTE** to promote entrepreneurial activities in the campus. The professional and general counseling offered to the students help them to perform better and face the challenges of life positively. **STEM** (Science Technology Engineering and Mathematics) is a club started by the students and supported by the management to initiate interdisciplinary activities. **Atrium, the literary club** to promote literary talents and conduct of oratorical competitions and Ethics club to imbibe ethical practices are also actively functioning.

The **Debating Union** is a club which attracts students who are skilled in expressing their view points in a strong and independent way by participating in competitions held by various organizations. In this context, it is to be mentioned that the prestigious 34<sup>th</sup> World University Debating Championship was organized for the first time in India at Rajalakshmi Engineering College from 28<sup>th</sup> Dec. 2013 to 3<sup>rd</sup> January 2014, with a participation of 800 teams from 98 countries. This mega event was possible due to the active involvement of REC students at earlier WUDCs held at Manila in 2011 and at Berlin in 2012.

The college felt that full time counseling is essential for some students for addressing relationship issues, depression, exam fear, anxiety, and personality problems. The professional counseling provided by REC has been very effective in the lives of the students. This service has enabled students to cope with emotional, mental and psychological problems, helped them to overcome stress and pressures of adolescence due to academic, social, emotional and interpersonal factors motivated them to perform better in their academics and to freely express their difficulties about their learning environment.

### **Organisation and Management**

The Rajalakshmi Educational Trust, the Governing Council, College Development Council and IQAC comprise of eminent personalities from academia and industry. The Research Advisor, Chief Executive Officer, Principal, Vice-Principal, the Academic Deans and HoDs are persons with outstanding profile who along with the management, plan, execute and monitor the functioning of REC for sustainable development. The HoDs in consultation with the faculty members are empowered to decide the activities of the respective departments and contribute to the growth of the college.

### **Innovations and Best Practices**

#### **Environmental consciousness:**

The institution displays sensitivity to issues like climate change and environmental issues. The net zero carbon foot print is achieved in the campus mainly through planting trees and the steps taken to conserve energy. There are provisions for solid waste management, waste water management and water harvesting. The college has taken initiatives to make the campus eco-friendly and solar powered heaters have been installed and there is a proposal to have a biogas plant also. A heat pump based hot water facility has been installed in the hostel which consumes one fourth of energy when compared to direct heating. Steps are being taken to further improve these schemes to provide the best environment in the sprawling campus area, housing the college and hostels. A sewage treatment plant at a cost of Rs 70 lakh has been established in the campus to treat and re-cycle the waste water from hostels, canteen etc.

#### **Best Practices**

In any higher educational institution, knowledge transfer is one of the most important areas to be focused. In this context, establishing a robust system to scientifically define the outcomes that are to be achieved, developing processes to transfer the knowledge and measuring the attainment of the outcomes quantitatively are followed periodically. Appropriate steps are taken for continuous improvement which is very essential.

A **skill matrix** is prepared taking into account faculty specialization, performance of the faculty in the last two years and professional experience. From the skill matrix, appropriate faculty is identified for teaching each course. The faculty with vast teaching experience and expertise is identified as a mentor for the course. Mentor of a particular course guides the junior and newly – appointed teachers to adopt appropriate teaching methodologies.

Any institution of higher education makes a mark in the global scenario through their research activities. This could be achieved, only by enabling the researchers to stay focused on their core work with a support system helping them to acquire the necessary funding, to procure the required facilities and dedicate adequate time for their research activities. In this context, **Research and Consultancy Advisory Board (RCAB)** has been constituted by the college with a vision of establishing a research ambience that facilitates the development of new creative research areas of Global importance in REC and to promote Consultancy.

Rajalakshmi Engineering College is ranked in the top ten colleges among the 552 colleges affiliated to Anna University, and 9<sup>th</sup> among all the engineering institutions in tamilnadu by a recent survey conducted by OUTLOOK based on placement, infrastructure, academic ambience etc., According to a survey conducted by AICTE and CII for the year 2012, REC has been rated as one of the top Colleges in India having the best industry institute interaction. DATAQUEST, a technical magazine, ranked 100 technical institutions based on a survey of colleges, employers and alumni in 2015 and REC has come in the 22<sup>nd</sup> place. Similarly another magazine, ‘Higher Education Review’ has recognized REC as “Engineering College of the year 2014” in acknowledgement of the Industry Alignment impacting the Society and the Education Fraternity. The Microsoft Corporation India Private Ltd. has awarded a ‘Certificate of Achievement’ to REC for having qualified for Platinum level recognition under the Microsoft ‘ED-Vantage’ program for the period 10-10-2013 to 09-10-2014.

The quest for distinction has been the driving force for REC to plan, execute, sustain and constantly strive for further enrichment of quality. The institution is growing from strength to strength and is marching towards excellence.



## RAJALAKSHMI ENGINEERING COLLEGE

(Accredited by NAAC and NBA & ISO 9001:2008 Certified)

Approved by A.I.C.T.E. & Govt. of Tamilnadu  
Affiliated to Anna University, Chennai



### Declaration by the Head of the Institution

I certify that the data included in this Self-study Report (SSR) are true to the best of my knowledge.

This SSR is prepared by the institution after internal discussions, and no part thereof has been outsourced.

I am aware that the Peer team will validate the information provided in this SSR during the peer team visit.

  
Signature of the Head of the institution

with seal:

**Dr. G. THANIGAIYARASU**  
B.E., M.Sc., (Engg.), Dr. Ing.,  
PRINCIPAL  
Rajalakshmi Engineering College  
Thandalam, Chennai - 602 105.

Place: Chennai

Date: 25.01.2016

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Rajalakshmi  
Institutions 



## RAJALAKSHMI ENGINEERING COLLEGE

(Accredited by NAAC and NBA & ISO 9001:2008 Certified)

Approved by A.I.C.T.E. & Govt. of Tamilnadu  
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### Certificate of Compliance

(Affiliated/Constituent/Autonomous Colleges and Recognized Institutions)

This is to certify that RAJALAKSHMI ENGINEERING COLLEGE (Name of the institution) fulfils all norms

1. Stipulated by the affiliating University and/or
2. Regulatory Council/Body [such as UGC, NCTE, AICTE, MCI, DCI, BCI, etc.] and
3. The affiliation and recognition [if applicable] is valid as on date.

In case the affiliation / recognition is conditional, then a detailed enclosure with regard to compliance of conditions by the institution will be sent.

It is noted that NAAC's accreditation, if granted, shall stand cancelled automatically, once the institution loses its University affiliation or Recognition by the Regulatory Council, as the case may be.

In case the undertaking submitted by the institution is found to be false then the accreditation given by NAAC is liable to be withdrawn. It is also agreeable that the undertaking given to NAAC will be displayed on the college website.

Date: 25.01.2016

Place: CHENNAI

*G. Thanigaiyarasu*

Principal/Head of the Institution

(Name and Signature with Office seal)

**Dr. G. THANIGAIYARASU**

B.E., M.Sc., (Engg.), Dr. Ing.,

PRINCIPAL

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