Sample Documents for Curriculum and Activities related to Gender Equity, Environment and Sustainability, Human Values and Professional Ethics

(A.Y. 2018-19)

INDEX

Gender Equity

- Women's day celebration by WIE
- Best Allrounder (Male and Female Student)
- Women Development Cell
- Dr. SSS Award for Excellence in Mathematics

FR. CONCEICAO RODRIGUES COLLEGE OF ENGINEERING
Fr. Agnel Ashram, Bandstand, Bandra (West), Mumbai – 400 050.

Ref. : CRCE / 2019 / 109 *Date* : March 1, 2019.

CIRCULAR

Dear Teaching & Non-Teaching Staff

Greetings from the IEEE-WIE CRCE Students Chapter.

IEEE WIE-CRCE on behalf of IEEE Bombay Section is organizing Women's Day Celebration on 8th March 2019 in our college from 1.30 p.m to 4.00 p.m in Samvaad.

Women's Day is being celebrated to enhance and encourage women to participate in every field and to felicitate them for their contribution towards the society. Following are the speakers invited for the programme :

1) Dr. Sushma Kulkarni, Director, Rajarambapu Institute of Technology, Sakharale
2) Ms. Rashmi Saha, Curiosity Gymn

We request all the teaching and non-teaching staff members to be a part of Women's Day Celebration.

Looking forward to your favourable response.

(MRS. SUSHMA NAGDEOTE)
IEEE- WIE BRANCH COUNSELLOR

(DR. SRIJA UNNIKRISHNAN)
PRINCIPAL

Women's Day

8th March 2019, Fr. CRCE

IEEE-WIE CRCE

International Women's Day is an occasion to celebrate the progress made towards achieving gender equality and women's empowerment but also to critically reflect on those accomplishments and strive for a greater momentum towards gender equality worldwide. It is a day to recognize the extraordinary acts of women and to stand together, as a united force, to advance gender equality around the world.

Women in Engineering (WIE) is one of the largest international professional organizations dedicated to promoting women engineers and scientists, and inspiring girls around the world to follow their academic interests in a career in engineering.

So, as a small part of this huge organisation CRCE chapter of WIE organised Women's day in the college to appreciate all the hardworking and talented women of CRCE.

The theme for International Women's Day (8 March) this year, **"Think Equal, Build Smart, Innovate for Change",** puts innovation by women and girls, for women and girls, at the heart of efforts to achieve gender equality.

First, the principal Dr. Srija Unnikrishnan addressed all students, she talked about her experience as a principal and she emphasized a lot on gender equality.

For this event WIE council had invited two women who are very successful in their respective fields.

Dr. Sushma Kulkarni, Director at Rajarambapu Institute of Technology spoke about her journey. She talked about how important the support of your family is in their success. She talked how girls should focus on their dreams no matter how difficult it is to achieve them. After this a student from BE Electronics recited a poem on women empowerment.

Ms. Rashmi Kaushik's words "Before others respect you should respect yourself and people around you", were an eye-opener. She is a journalist, educator with a vision for students and a passionate writer and poet she continues to remain an enthusiastic student with a deep yearning to imbibe and

learn every step of the way. She talked how women themselves don't understand each other.

The event was ended by giving a vote of thanks to the dignitaries. It was a memorable day for the students as well as teachers of Fr. CRCE.

Ms. Sushma Nagdeote
Branch Counsellor (IEEE - WIE CRCE)

FR. CONCEICAO RODRIGUES COLLEGE OF ENGINEERING

Fr. Agnel Ashram, Bandstand, Bandra (W), Mumbai – 400 050.

Ref.: CRCE / 2019 / 191 *Date* : February 13, 2019.

NOTICE

BEST ALL ROUNDER

Academic Year 2018-2019

We are pleased to announce the names of the winners of the Best All Rounder Award 2018-2019.

Best All Rounder (Female Category) - **Ms. Vaessa Rodrigues**
B.E. Production Engineering

Best All Rounder (Male Category) - **Mr. Gopesh Rajderkar**
B.E. Computer Engineering

Congratulations to the winners and to all the participants.

(DR. SRIJA UNNIKRISHNAN)
PRINCIPAL

CC : Fr. Peter D'Souza
Fr. Valerian D'Souza
Dr. V.S. Bilolikar

SOCIETY OF ST. FRANCIS XAVIER, PILAR'S
FR. CONCEICAO RODRIGUES COLLEGE OF ENGINEERING
(Approved by AICTE & Affiliated to University of Mumbai)
Fr. Agnel Ashram, Bandstand, Bandra (W), Mumbai - 400 050.
Phone : (022) 6711 4000, 6711 4101, 6711 4104 • Fax : 6711 4100
Website : www.frcrce.ac.in • Email : crce@fragnel.edu.in

Ref.: CRCE / 2017 / 357

Date : August 1, 2017.

NOTICE

" WOMEN'S DEVELOPMENT CELL "

In an effort to promote the well being of the girl students, Teaching and Non-Teaching Women Staff of the Institute, to deal with the cases / complaints of sexual harassment and to implement the women's policies in general, a **Women's Development Cell** has been re-constituted in the College. This is in compliance with the decision of the Supreme Court of India. The College Women's Development Cell shall consist of the following members :-

S.No.	Name of the Member		Contact Nos.
1	Dr. Srija Unnikrishnan	President	9869005457
2	Mrs. Sapna Prabhu	Co-ordinator	9833545743
3	Mrs. Jagruti Save	Member	9869621900
4	Dr. Hemant Khanolkar	Member	9969154398
5	Mrs. Sushma Nagdeote	Member	8879626260
6	Mrs. Neelam D'Silva	Member	9823449254
7	Ms. Neha Prakash	NGO Representative	8419996979
8	Ms. Suparna Shetty	Students Representative	9769438167

All the concerned are requested to note the contact details of the above members and represent their grievance to any of the member, if any for their consideration and suitable action.

(DR. SRIJA UNNIKRISHNAN)
PRINCIPAL

Copy to : - Fr. Nazareth Fernandes, Fr. Valerian D'Souza
- HODs – Production Engg, Electronics Engg, Computer, I.T., H&S
- Members of Women's Development Cell – for information and necessary action
- Staff / Student's Notice Board

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7	Ms. Neha Prakash	NGO Representative	8419996979
8	Ms. Disha Raj	Students Representative	9829731799

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(DR. SRIJA UNNIKRISHNAN)
PRINCIPAL

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- HODs – Production Engg, Electronics Engg, Computer, I.T., H&S
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Fr. Conceicao Rodrigues College of Engineering.

Fr. Agnel Ashram, BandStand, Bandra (W), Mumbai, Maharashtra 400050.

Dr.SSS Award for Excellence in Mathematics

- Mathematics is an indispensable subject for any field of study.
- It is the science of space, time & numbers & hence the Queen of Sciences.
- It is a constant guide.
- It helps in sharpening the reasoning power & mental alertness of all human beings.
- It is essential for men on the street as well as scientist, engineers & philosophers.
- To promote the interest in Mathematics, Mrs. Sundary S.Prabavathy, Head, Dept.of Humanities & Science has started the Dr.SSS Award for Excellence in Mathematics from the year 2012 in memory of her late father Dr. S.Sankara Subramanian.

Eligibility for the award

Students of B.E. Semester VIII (All Branches) who have

- Secured 100/100 in Applied Mathematics
- and / or
- Secured an average of 80% and above
- [Combining all four Semesters: Sem – I to Sem IV]
- Can submit their details to H.O.D. – Mathematics (sponsoring the award) on or before due date.
- [*Roll No., Name, Marks secured in all 4 Semesters (attach copy of mark sheets) and average mark in Applied Mathematics].
- Details should be submitted alongwith proper application/ covering letter.

Selection Procedure:-

- After receiving the application along with required documents the application forms are analyzed merit wise.
- Top three students are selected for the award. In case of tough competition five students are selected.
- Students who are selected (the winners of this award) are informed through notice forwarded to the respective class teachers of B.E. & also the notice is displayed on the notice board.
- The winners are felicitated with the prize and certificate during EUPHORIA [Annual day] every year.

Sponsored by: PROF. S. PRABAVATHY **(DR.SRIJA UNNIKRISHNAN)**

H.O.D.- MATHEMATICS **PRINCIPAL**

Environment and Sustainability

- Courses Offered in Curriculum
- NSS Acitivites
- Rotract Activities

First Year Engineering (Semester I & II), Revised course from Academic Year 2016 -17, (REV- 2016) (Common for all Branches of Engineering)

Scheme for FE - Semester – I

Sub. Code	Subject Name	Examination Scheme							
		Theory Marks				Term Work	Pract.	Oral	Total
		Internal Assessment			End sem. exam				
		Test 1	Test 2	Average of Test 1 & Test 2					
FEC101	Applied Mathematics-I	20	20	20	80	25	-	-	125
FEC102	Applied Physics-I	15	15	15	60	25	-	-	100
FEC103	Applied Chemistry –I	15	15	15	60	25	-	-	100
FEC104	Engineering Mechanics	20	20	20	80	25	-	25	150
FEC105	Basic Electrical Engineering	20	20	20	80	25	-	25	150
FEC106	Environmental studies	15	15	15	60	-	-	-	75
FEL101	Basic Workshop Practice-I	-	-	-	-	50	-	-	50
				105	420	175		50	750

Sub Code	**Subject Name**	**Teaching Scheme**			**Credits Assigned**			
		Theory	**Pract.**	**Tut.**	**Theory**	**TW/Pract**	**Tut.**	**Total**
FEC101	Applied Mathematics-I	04	-	01	04		01	05
FEC102	Applied Physics-I	03	01	-	03	0.5	-	3.5
FEC103	Applied Chemistry -I	03	01	-	03	0.5	-	3.5
FEC104	Engineering Mechanics	05	02	-	05	01	-	06
FEC105	Basic Electrical Engineering	04	02	-	04	01	-	05
FEC106	Environmental studies	02	-	-	02	-	-	02
FEL101	Basic Workshop Practice-I	-	04	-	-	02	-	02
		21	10	01	21	05	01	27

Sub Code	Subject Name	Teaching Scheme			Credits Assigned			
		Theory	Pract.	Tut.	Theory	TW/Pract.	Tut.	Total
FEC106	**Environmental Studies**	02	-	-	02	-	-	02

Sub Code	Subject Name	Examination Scheme							
		Theory (out of 75)				Term Work	Pract.	Oral	Total
		Internal Assessment (out of 15)			End Sem. exam (out of 60)				
		Test 1	Test 2	Average of Test 1 and Test 2					
FEC106	**Environmental Studies**	15	15	15	60	-	-	-	75

Details of the Syllabus:-

Sr. No.	Details	Hrs
Module 1	Overview of Environmental Aspects: • Definition, Scope and Importance of Environmental Study • Need for Public awareness of environmental education • Introduction to depletion of natural resources: Soil, Water, Minerals and Forests. • Global crisis related to – Population, water, sanitation & Land. Ecosystem: • Study of ecosystems: Forest, desert and aquatic (in brief). • Energy flow in Ecosystem, overview of Food Chain, Food Web and Ecological Pyramid. • Concept of ecological succession and its impact on human beings (in brief). Case Study on Chipko Movement (Uttarakhand, India), (began in 1973).	4
Module 2	Aspects of Sustainable Development: • Concept and Definition of Sustainable Development. • Social, Economical and Environmental aspects of sustainable development. • Control measures: 3R (Reuse, Recovery, Recycle), • Resource utilization as per the carrying capacity (in brief). Case Study on Narmada Bachao Andolan (Gujarat, India, in the mid and late 1980s).	2
Module 3	Types of Pollution: • Water pollution: Sources of water pollution and Treatment of Domestic and industrial waste water (with flow-diagram of the treatment), • Land Pollution: Solid waste, Solid waste management by land filling,	8

	composting and incineration • Air pollution: Sources of air pollution, Consequences of air pollution :- Greenhouse effect (Explanation with schematic diagram), Photochemical Smog (Explanation with chemical reaction). Cleaning of gaseous effluents to reduce air contaminants namely dust particle or particulate matters by using:- (i) Electrostatic precipitators (ii) Venturi scrubber (Schematic diagram and working). • Noise pollution: Sources, effects, threshold limit for different areas and control methods. • E-Pollution: Definition, Sources and effects. • Nuclear pollution: Sources and effects. Case study on Water Pollution of Ganga River. Case study on London smog (U. K.)(December, 1952). Case Study of Fukushima Disaster (March, 2011).	
Module 4	Pollution Control Legislation: • Functions and powers of Central and State Pollution Control Board. • Environmental Clearance, Consent and Authorization Mechanism. Case Study of Dombivali MIDC- Boiler Blast Tragedy (Thane, Maharashtra, India), (May, 2016).	3
Module 5	Renewable Sources of Energy: • Importance of renewable sources of energy. • Principle and working with schematic diagram of :- (i) Solar Energy: (a) Flat plate collector and (b) Photovoltaic cell. (ii) Wind Energy: Wind Turbines. (iii) Hydropower: Hydropower generation from water reservoir of the dam. (iv) Geothermal Energy: Utilisation of underground sources of steam for power generation.	4
Module 6	Technological Advances to overcome Environmental problems: • Concept of Green Buildings, • Various indoor air pollutants and their effects on health. • Carbon Credit: Introduction and general concept. • Disaster Management: Techniques of Disaster Management to cope up with (i) Earthquake and (ii) Flood. Case Study on Earthquake in Latur (Maharashtra, India), (September,1993). Case Study on Cloudburst and Landslides at Kedarnath (Uttarakhand, India), (June, 2013).	5

Tests 1 & 2

1. Each test will be of 15 marks.
2. At least one question will be based on case study. Candidate is expected to explain the salient features of the incident and suggest preventive measures.

Theory Examination:

1. Question paper will comprise of total 6 questions, each of 15 marks.
2. Total four questions need to be solved.
3. Question Number One will be compulsory and it will be based on entire syllabus wherein sub-questions of 2 to 3 marks will be asked.
4. Remaining questions i.e. Q.2 to Q.6 will be mixed in nature and will be divided in three parts (a), (b) & (c) and they will belong to different modules.
5. In question paper, weight of each module will be proportional to number of respective lecture hours as mentioned in the syllabus.

Recommended Books:

1. Environmental Studies by Benny Joseph, TataMcGraw Hill.
2. Environmental Studies by R.Rajagopalan, Oxford University Press.
3. Environmental Studies by. AnanditaBasak, Pearson Education.
4. Essentials of Environmental Studies by Kurian Joseph &Nagendran, Pearson Education.
5. Fundamentals of Environmental Studies by Varadbal G. Mhatre, Himalaya Publication House.
6. Perspective of Environmental Studies, by Kaushik and Kaushik,New Age International.
7. Renewable Energy by Godfrey Boyle, Oxford Publications.
8. Textbook of Environmental Studies by Dave and Katewa, Cengage Learning.
9. Textbook of Environmental studies by ErachBharucha, University Press.
10. Environmental pollution control engineering by C.S. Rao, New Age International (P) Limited Publishers.

T.E. (Production) Sem.-V

Course Code	Course Name	Teaching Scheme (Contact Hours)		Credits Assigned		
		Theory	Pract	Theory	Pract	Total
PEC501	Design of Mold & Metal Forming Tools	04	--	04	--	04
PEC502	Operations Research	03	--	03	--	03
PEC503	Machine Design-I	04	--	04	--	04
PEC504	CAD/CAM/CIM	04	--	04	--	04
PEC505	Metrology & Quality Engineering	04	--	04	--	04
PEDLO 501X	Department Level Optional Course I	03	--	03	--	03
PEL501	Design of Mold & Metal Forming Tools Laboratory	--	02	--	01	01
PEL502	Machine Design-I Laboratory	--	02	--	01	01
PEL503	CAD/CAM/CIM Laboratory	--	02	--	01	01
PEL504	Metrology & Quality Engg Laboratory	--	02	--	01	01
PEL505	Business Communication & Ethics	--	02*+02	--	02	02
	Total	**22**	**12**	**22**	**06**	**28**

Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Pract. /Oral	Total
		Internal Assessment			End Sem Exam	Exam. Duration (in Hrs)			
		Test1	Test 2	Avg.					
PEC501	Design of Molds & Metal Forming Tools	20	20	20	80	03	--	--	100
PEC502	Operations Research	20	20	20	80	03	--	--	100
PEC503	Machine Design-I	20	20	20	80	03	--	--	100
PEC504	CAD/CAM/CIM	20	20	20	80	03	--	--	100
PEC505	Metrology & Quality Engg.	20	20	20	80	03	--	--	100
PEDLO 501X	Department Level Optional Course I	20	20	20	80	03	--	--	100
PEL501	Design of Mold & Metal Forming Tools Laboratory	--	--	--	--	--	25	25	50
PEL502	Machine Design-I Laboratory	--	--	--	--	--	25	25	50
PEL503	CAD/CAM/CIM Laboratory	--	--	--	--	--	25	25	50
PEL504	Metrology & Quality Engg Laboratory.	--	--	--	--	--	25	25	50
PEL505	Business Communication & Ethics Laboratory						50	--	50
	Total			**120**	**480**		**150**	**100**	**850**

* **Theory for entire class to be conducted**.

Course Code	Department Level Optional Course I
PEDLO5011	Internal Combustion Engines
PEDLO5012	Finite Element Analysis
PEDLO5013	Plastic Engineering
PEDLO5014	Micro and Nano Manufacturing
PEDLO5015	Sustainable Manufacturing

Course Code	Course Name	Credits
PEDLO5015	**Sustainable Manufacturing**	**03**

Objectives

1. To introduce basic concepts related to sustainability and sustainable development.
2. To get conversant with indigenous and global concerns about sustainability and its implications in manufacturing.
3. To familiarize with various technological innovations, approaches & environmental standards /legislations to promote sustainable development.

Outcomes: Learner will be able to…

1. Illustrate the agenda of indigenous and global sustainability to fulfil green expectations.
2. Demonstrate the knowledge about management of waste, pollution & energy conservation.
3. Demonstrate the knowledge of sustainability issues with its implementation in manufacturing.
4. Illustrate the relevance and implications of environment friendly materials.
5. Illustrate the implications of environment management in the context of modern industrial practices.
6. Develop the sustainability approach in environmental strategy and manufacturing.

Module	Contents	Hrs.
01	**Sustainability**: Basic concepts related to sustainability and sustainable development. Issues and challenges facing sustainable development. Global & indigenous sustainability agenda, green expectations & green movement.	**04**
02	**Management of waste & pollution**: Types, sources and nature of wastes, waste processing, green processing & engineering operations, Energy recovery, and 3 R principle. Types of pollution and management:-Anti pollution approaches & guide lines.	**08**
03	**Management of Energy:** Sources of energy, renewable energy, Innovations in generation, conservation, recycling and usage of energy. Energy audit and implications.	**07**
04	**Environment friendly materials** : Materials for sustainability , eco-friendly and new age energy efficient and smart materials , alternative manufacturing practices , materials and selection of manufacturing processes , control on use of renewable materials , Bio-degradable materials recycling of materials.	**07**
05	**Environment Management** : Innovations for reuse , bio-processing technology , sustainable loading on ecosystems , concept of eco-efficiency and its implementation , Environment analysis from raw materials to disposal (cradle to grave concept) sustainable design and materials for sustainable design , Environmental standards and legislations. ISO 14000, carbon foot print, anti-pollution boards, Environment management in business world, changing scenario in global perspective.	**08**

06	**Integrating sustainability approach**: Environmental issues in operating strategy, creating sustainable manufacturing, promoting sustainability awareness, sustainability rating schemes, eco-labelling programmes, human values and professional ethics in sustainable manufacturing. Encouraging innovations in sustainable manufacturing.	**06**

Assessment:

Internal Assessment for 20 marks:
Consisting **Two Compulsory Class Tests**
First test based on approximately 40% of contents and second test based on remaining contents (approximately 40% but excluding contents covered in Test I)

End Semester Examination:
Weightage of each module in end semester examination will be proportional to number of respective lecture hours mentioned in the curriculum.

1. Question paper will comprise of total **six questions**, **each carrying 20 marks**
2. **Question 1** will be **compulsory** and should **cover maximum contents of the curriculum**
3. **Remaining questions will be mixed in nature** (for example if Q.2 has part (a) from module 3 then part (b) will be from any module other than module 3)
4. Only **Four questions need to be solved**

Reference Books:

1. *Strategic Management of Sustainable manufacturing operations* (Advances in logistics opreations & Management) By. Rameshwar Dubey & Angappa Gunabekaran by Imuste Productivity press.
2. *Analysis for Smart energy management: Tools and applications for sustainable manufacturing.* By Seog-chanoh and Alfred .J.Hildreth , Springer Series.
3. *Advances in sustainable Manufacturing* By Gunther Seliger and Marwan M.K. khraishah, Springer Series
4. *Green Management* by M.Karpagam, Geetha Jaikumar, Ane Books Pvt.Ltd.
5. *Design for Environment*: A guide to sustainable Product Development.
6. *Sustainable Development* By M.K. Ghosh Roy Ane Books Pvt.Ltd,

B. E. (Production) Sem.-VIII

Course Code	Course Name	Teaching Scheme (Contact Hours)		Credits Assigned		
		Theory	Pract.	Theory	Pract.	Total
PEC801	Automation and Control Engineering	4	2	4	1	5
PEC802	Computer Aided Manufacturing	4	2	4	1	5
PEC803	Engineering Economics, Finance, Accounting and Costing	4	--	4	--	4
PEC804	Total Quality Strategy	4	2	4	1	5
PEC805	Industrial relations and Human Resource Management	4	--	4	--	4
PEE801X	Elective-I	3	2	3	1	4
	TOTAL	**23**	**08**	**23**	**4**	**27**

Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Pract./ Oral	Total
		Internal Assessment			End Sem. Exam.	Exam. Duration (in Hrs)			
		Test1	Test2	Avg.					
PEC801	Automation and Control Engineering	20	20	20	80	03	25	25	150
PEC802	Computer Aided Manufacturing	20	20	20	80	03	25	25	150
PEC803	Engineering Economics, Finance, Accounting and Costing	20	20	20	80	03	--	--	100
PEC804	Total Quality Strategy	20	20	20	80	03	25	25*	150
PEC805	Industrial Relations and Human Resource Management	20	20	20	80	03	--	---	100
PEE801X	Elective-I	20	20	20	80	03	25	--	125
Total		**--**	**--**	**120**	**480**	**--**	**100**	**75**	**775**

*** Only ORAL examination based on term work and syllabus**

List of Electives

Course codes	Course Name	Course codes	Course Name
PEE8011	Sales and Marketing Management	PEE8016	Mechatronics
PEE8012	Logistics and Supply Chain Management	PEE8017	Industrial Robotics
PEE8013	Plastics Engineering	PEE8018	Product Design and Development
PEE8014	Entrepreneurship Development	PEE8019	Sustainable Engineering
PEE8015	World Class Manufacturing	PEE80110	Maintenance Engineering

Course Code	Course/Subject Name	Credits
PEE8018	**Product Design and Development**	**3+1**

Objectives

1. To acquaint with various approaches in designing and developing new products.
2. To familiarize with various software solutions for designing and developing products.
3. To familiarize with modern approaches like concurrent engineering, product life cycle management, robust design, rapid prototyping / rapid tooling, etc.

Outcomes: Learner will be able to…

1. Develop competency in designing and developing products right from the conceptual level incorporating cost effective solutions.
2. Get familiarized with the computer aided product design approach.

Module	Details	Hrs.
01	1.1 Introduction: Definition of product design, Classification of products, Design by evolution, Design by innovation, various phases in product development and Design, Morphology of Design, Considerations in product design, Product specifications. 1.2 Conceptual Design: Market research, Need based origin of product, Technology driven products, Analysis of ideas from various angles of design methodology and user needs, Function analysis and component process study, 2-D and 3-D representations in the form of concept drawing, Computer generated images, dummy and prototypes. 1.3 Materials: Overview of materials including new generation materials, Tailor made material concepts, Material selection process.	**05**
02	2.1 Design for manufacturing (DFM): Producibility requirements, Accuracy and Precision requirements, Forging and casting design, Design for pressed, mechanical components, powder metallurgical components, Die cast and special cast components, expanded metals and wire forms. 2.2 Design for Assembly (DFA): Analysis of assembly requirements, Standardization, Ease of Assembly and disassembly, Design for bolted, welded and riveted components, Design for hinge and snap fit assemblies, maintenance, consideration of handling and safety, Modular concepts.	**05**
03	3.1 Strength considerations in Design: Criteria and objectives, Designing for uniform strength, Designing for stiffness and rigidity, Practical ideas for material saving in design of ribs, corrugations, rim shapes, bosses, laminates, etc. 3.2 Designing with plastics: Mechanical behavior, special characteristics and considerations, Design concepts for product features to be manufactured by various production process technologies, Special considerations for designing of components for load bearing applications, Designing for safety, Reliability and environmental considerations.	**06**

04	Value Engineering: Product value and its importance, Value analysis job plan, Steps to problem solving and value analysis, Value analysis tests, Value Engineering idea generation check list, Material and process selection in value engineering, Cost reduction, case studies and exercises.	**04**
05	5.1 Product Ergonomics: Anthropometry, Environmental conditions, thermal, noise, vibration, displays, illusions, Psycho and psychological aspects in design, Man-machine information exchange. 5.2 Product Aesthetics: Visual awareness, Form elements in context of product design, Concepts of size, shape and texture, Introduction to colour and colour as an element in design, Colour classifications and dimensions of colour, Colour combinations and colour dynamics, Interaction / communication of colours, Psychological aspects of colours, generation of products forms with analogies from nature. 5.3 Product Graphics: Graphics composition and layout, Use of grids in graphics composition, Study of product graphics and textures. 5.4 Creativity: Role of creativity in problem solving, Vertical and lateral thinking, Brain storming, Synectics, Group working dynamics, Adaptation to changing scenarios in economics, social, cultural and technological fronts, Anticipation of new needs and aspirations.	**10**
06.	6.1 Software solutions: Software for drafting, modeling, assembly, detailing, CAM interfacing, Rapid tooling/rapid prototyping, etc. 6.2 Modern Applications: Concurrent Engineering, QFD, Robust Design, Sustainable Design, Rapid Prototyping, Rapid Tooling, Product Life Cycle Management techniques and application areas.	**06**

List of Exercises

1. At least two presentations pertaining to topics selected from syllabus contains.
2. Redesign of an existing product with 3D modeling to solve indentified lacuna present in the product.
3. One assignment on understating design procedure and documenting and interpreting data.
4. One 3-D modeling on colour balance and radii manipulation.
5. One assignment on product detailing of moulded component.

Term Work

Term work shall consist of exercises listed in the above list

The distribution of marks for term work shall be as follows:

- Laboratory work (Experiment/ programs and journal): **10** marks
- Assignments: **10** marks
- Attendance (Theory and Practical): **05** marks

The final certification and acceptance of term work ensures the satisfactory performance of laboratory work and minimum passing in the term work.

Internal Assessment

Assessment consists of two tests out of which; one should be compulsory class test (on minimum 40% of curriculum) and the other is either a class test (on minimum 70% of curriculum) or assignment on live problems or course project.

Theory Examination

In question paper, weightage of each module will be proportional to number of respective lecture hours as mention in the syllabus.

1. Question paper will comprise of 6 questions, each carrying 20 marks.
2. Question number 1 will be compulsory and based on maximum contents of the syllabus
3. Remaining questions will be mixed in nature (for example, if Q.2 has part (a) from module 3 then part (b) will be from other than module 3)
4. Total four questions need to be solved.

References

1. *Design Fundamentals*, R. G. Scott.
2. *Design methods inter science*, Jomes.
3. *Creative Engineering Design*, Buhl H. R.
4. *The Science of Engineering Design*, Holt, Hill Percy H.
5. *Ergonomics*, Merilyn Joyce, Ulrika Waller Steiner.
6. *Human Factors in Engineering & Design*, 4th edition
7. *Human Engineering Guide & Equipment Design*, Morgon C. T. & Others
8. *Barron D.ed, Creativity*, New York, Art Directors
9. *Design for Production*, Baldwin E. W. & Niebel B. W. Edwin, Homewood Illinois.

Course Code	Course Name	Teaching Scheme			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/Practical	Tutorial	Total
ELX DLO6022	Electronic Product Design	04	---	---	04	---	---	04

Course Code	Course Name	Examination Scheme						
		Theory Marks				Term Work	Oral & Practical	Total
		Internal Assessment (IA)			End Semester Examination			
		Test I	Test II	Average				
ELX DLO6022	Electronic Product Design (EPD)	20	20	20	80	---	---	100

Rationale :- The aim of this course is to enable students to gain practical experience & nurture their creativity in electronic product design & the objective is to provide students with a clear understanding of the practical design problems of the electronic products at an introductory level. With this course, students are expected to become familiar with the concept of designing a product as per the requirements (non-technical) & given specifications (technical), component tolerances, production constraints, safety requirements & EMC standards.

Course Objectives:-

1. To understand the stages of product (hardware / software) design & development
2. To learn different considerations of analog, digital & mixed circuit design
3. To be acquainted with methods of PCB design & different tools used for the same
4. To be aware of the importance of testing in product design cycle
5. To gain knowledge about various processes & importance of documentation

Course Outcomes :-

At the end of the course, students should gain the ability to :-

- **CO-1 :-** Design electronic products using user-centered designing processes
- **CO-2 :-** Identify & recognize essential design & production procedures of electronic products
- **CO-3 :-** Implement a prototype for meeting a particular requirement / specification
- **CO-4 :-** Demonstrate problem solving & troubleshooting skills in electronic product design
- **CO-5 :-** Prepare the relevant set of design documentation & present it as a case study

Module No.	Topics	Hours
1	**INTRODUCTION TO ELECTRONIC PRODUCT DESIGN** Man-machine dialog & industrial design, user-centered design, elements of successful design, cognition, ergonomics, packaging & factors; design for manufacture, assembly & disassembly wiring, temperature, vibration & shock; safety, noise, energy coupling, grounding, earthing, filtering & shielding	06
2	**HARDWARE DESIGN & TESTING METHODS** Design process, identifying the requirements, formulating specifications, design specifications, system partitioning, functional design, architectural design, functional model v/s architectural model, prototyping, performance & efficiency measures, formulating a test plan, writing all the specifications, test procedures & test cases, design reviews, module debug & testing – black box testing, white box testing, grey box testing	10
3	**SOFTWARE DESIGN & TESTING METHODS** Types of software, the waterfall model of software development, models, metrics & software limitations, risk abatement & failure prevention, software bugs & testing, good programming practice, user interface, embedded & real-time software	10
4	**PRINTED CIRCUIT BOARD (PCB) DESIGNING** Fundamental definitions, standards, routing topology configuration, layer stack up assignment, grounding methodologies, aspect ratio, image planes, functional partitioning, critical frequency & bypassing, decoupling; design techniques for ESD protection, guard-band & guard-rings	08
5	**PRODUCT DEBUGGING & TESTING** Steps of debugging, the techniques for troubleshooting, characterization, electromechanical components, passive components, active components, active devices, operational amplifier, analog-to-digital conversion, digital components, inspection & testing of components, process of simulation, prototyping & testing, integration, validation & verification, EMI & EMC issues	08
6	**THE DOCUMENTATION PROCESS** Definition, needs & types of documentation, records, accountability & liability, audience, steps in preparation, presentation & preservation of documents, methods of documentation, visual techniques, layout of documentation, bills of materials, manuals – instructional or operating manual, service and maintenance manual, fault finding tree, software documentation practices	06
1 – 6	**TOTAL**	48

Recommended Books :-

1. R. G. Kaduskar & V. B. Baru, Electronic Product Design, 3rd edition, Wiley India
2. Kim Fowler, Electronic Instrument Design, 2nd edition, Oxford University Press
3. Robert J. Herrick, PCB Design Techniques for EMC Compliance, 2nd edition, IEEE Press
4. G. C. Loveday, Electronic Testing & Fault Diagnosis, 4th edition, A. H. Wheeler Publishing
5. James K. Peckol, Embedded Systems – A Contemporary Design Tool, 1st edition, Wiley Publication
6. J. C. Whitaker, The Electronics Handbook, CRC Press

Internal Assessment (IA) :-

Two tests must be conducted which should cover at least 80% of syllabus. The average marks of both the tests will be considered as final IA marks.

End Semester Examination :-

1. Question paper will comprise of 6 questions, each carrying 20 marks.

2. The students need to solve total 4 questions.

3. Q.1 will be compulsory and based on entire syllabus.

4. Remaining questions (Q.2 to Q.6) will be set from all modules.

5. Weightage of each module in question paper will be proportional to the number of respective lecture hours mentioned in the syllabus

NSS REPORT 2019

It is said, "Those who do the most for others are the happiest". While it is true that it can be done by just acting as a member, why join the council? The answer is simple. Just helping others is not always enough. True social service comes in convincing others to reach out to the less fortunate as well. We express our heartfelt gratitude towards Prof. Saurabh Koregaonkar and Prof. Dipali Bhise, for their sturdy support and encouragement throughout the year.

Just like every year, our membership drive received an overwhelming response and a team of roughly 100 volunteers was formed. Our first official event was Stem Cell Donation Registration, in collaboration with the NGO, Datri. The event that followed, was the NSS Orientation-2k18 where the activities of the previous year and the objectives of the present year were discussed with the volunteers in the presence of the Principal. In all, we planned to organise four beach clean-up drives this year, out of which three have already been conducted. The first beach clean-up took place at Versova Beach, along with an activist Mr. Afroz Shah and group. Our volunteers got together and cleaned up a plastic-filled beach located adjacent to a slum habitat. The next cleanup drive was organised at Vasai Beach, and the third one again with Mr. Afroz Shah in Malad.

On the beautiful morning of Synergy, CRCE's tech-fest, NSS volunteers gathered together at Bandra Station and marched all the way to college as part of the Anti-Plastic Rally. We received the support and praise of the Bandra police in this enterprise and we believe that we managed to spread knowledge about the harmful effects of plastic, amid the eyes of curious on-lookers in our way. We are grateful to all students as well as faculty members who donated their blood and helped in making the event a huge success. Next was a back-to-back session on Fire Safety Awareness Workshop and Seminar in association with FSAI that helped our students learn the basic techniques of fire safety, i.e. how to operate a fire extinguisher, etc. A tree plantation drive was organised at the Kalina University Campus, where volunteers were taught exactly how a tree is planted so that it gets maximum nutrition and is able to sustain itself.

From the 26th Dec to 1st Jan, the most anticipated 7-Day camp to our adopted village, Khamgoan, Raigad was organised. All program officers accompanied us during the camp. We had various events lined up there such as documenting of village information for the gram panchayat, street plays, career-counselling for school kids, rice factory visits, etc.

Throughout the year we have lived up our motto, "Not me, but you" and we will continue doing so. We sincerely thank our college for providing us a platform full of opportunities and for supporting all our endeavours. Cheers!

Lenis Rodrigues
Event Head

FR.CONCEICAO RODRIGUES COLLEGE OF ENGINEERING

Father Angels Ashram Road, Bandra West, Mumbai, Maharashtra 400050.

Phone: 022 6711 4000

REPORT OF ROTARACT CLUB OF FRCRCE

(2018-19)

The Rotaract Club of CRCE has been affiliated with the Rotary Club of Bombay Bandra, which has recognized the efforts that the Rotaract Club of Fr. CRCE has put in order to make a difference to the society. The Rotaract Club of Fr. agnel College (Bandra West) is affiliated to an NGO called Bigger Than Life. Bigger Than Life (BTL) is an NGO who reaches out to the underprivileged children and their families who stay in the slums of Bandstand.

Following are list of events in odd and even semester with its details.

ODD semester events

- **Green Hands Project**
- **NGO Sessions**
- **SYNERGY FEST EVENTS- Foot Pool , Amazing Race**
- **MICDROP**

Even semester events

- **Paws For A Cause**
- **HEART AND SOLE RUN 2.0**
- **Come Together**

Green Hands Project

Date: 28th July, 2018
Venue: Bigger Than Life NGO, Santacruz

Description:

Project Green Hands was undertaken by the Rotaract Club of Fr. CRCE and supported by the Rotary Club of Bombay Bandra. This tree plantation drive was conducted at NGO Bigger Than Life, Santacruz. The children of the NGO actively participated in this drive and they were briefed about the importance of tree plantation.

Human Values

- NSS Acitivites
- Rotract Activities
- TedxCRCE Activities

NGO Sessions

The Rotaract Club of Fr. CRCE conducted Three Projects with the NGO Bigger Than Life. The name of the projects were:-

1. **Awaaz**:- Project Awaaz was conducted in the month of August at the Santacruz branch of the NGO Bigger Than Life. Following thingy were covered in this project
- Non Violence
- Gender equality
- Self Defense
- Good Touch Bad Touch

2. **The You Project** :- The You Project was conducted in the month of September with the kids of the NGO. This project was our attempt to make the kids self sufficient and inculcate good values in them. This project covered
- basics to first aid
- Facts
- Self appreciation
- values and morals

3. **We Are The World**:- We are the world was the final project for the year and was conducted in the month of January. This particular project was focused to enhance the creativity and observation power of the children. We are the world covered
- Take flight with the kite
- Sea's the day
- DIY: Paper Bag
- Plants and endangered species

Paws For A Cause

Date: 9th February, 2019
Venue: The Welfare of Stray Dogs, Lower Parel
Footfall: 3 batches of 10 people each
Timing: 10am-1pm

Description:
Paws for a Cause was Rotaract's Initiative for creating awareness about animal welfare, while also having a chill session- playing with dogs. 3 batches of 10 were made, and the batches were headed by two Club members. Each batch had a session of 1 hour each. The volunteers were given tasks like feeding, bathing, brushing the fur, and walking the dogs. The supervisors at the organisation were giving helpful tips and information about animal care.

HEART AND SOLE RUN 2.0

DATE : 3rd March, 2019

TIME : 15Km - 6:15am

10Km - 6:30am

5Km - 6:45am

1Km - 7:00am

VENUE : Fr. Conceicao Rodrigues College of Engineering

DESCRIPTION : There were three warm up sessions after an interval of every 15 mins which were followed by the commencement of the the respective run. The charity run covered the routes of Bandstand, Carter Road, Hill Road. The run concluded in our college followed by breakfast and Medal and certificate distribution.

Number of Participants :500-600

Cash Prize for winners :

15km:

1st place

Men - Rs3000

Women - Rs 3000

2nd place

Men - Rs 2000

Women--Rs 2000

3rd Place

Men - Rs 1500

Women--Rs 1500

10km :

<u>1st Place</u>

Men- Rs2000

Women - Rs2000

<u>2nd place</u>

Men - Rs1500

Women - Rs1500

<u>3rd place</u>

Men - Rs 1000

Women - Rs 1000

Ratna Nidhi Charitable Trust Book Sorting

TEDxCRCE organised a book sorting session on February 23, 2019 at **Ratna Nidhi Charitable Trust, Grant Road (E). Ratna Nidhi is proud to partner and lead with Alibaba Group's Mission Million Books.** The project seeks to distribute 1 million educational books Free of Cost to 10,000 educational institutions in India.

The project aims at educating young India by cultivating reading habits among children and provides access to quality reading material.

During the session, our volunteers sorted around 4000+ books according to their categories which included Engineering, Medical, Entrance Exams, Stories & Novels etc. 7 volunteers from TEDxCRCE were part of this drive. The books that were sorted are used by underprivileged children across Mumbai for their better future. With this drive, TEDxCRCE continues to serve the society.

Aman Shaikh

Community Head, TEDxCRCE

Prof. Prachi Patil

Faculty incharge, TEDxCRCE

Ratna Nidhi Charitable Trust Volunteering Drive

1. Aman Sheikh
2. Jaison Dsouza
3. Aditya Khajuria
4. Ishpreetkaur Dham
5. Saptarshi Chatterjee
6. Kraig Fernandes
7. Tanmay Ghadi

BANDRA FAIR

TEDxCRCE conducted its one of the most awaited events –"The Bandra Fair". This is a part of our community events aimed at serving for the society. The TEDxCRCE volunteers helped in the management of The Mount Mary Fair which takes place in Bandra every year and is celebrated with utmost zeal. More than 15000 people attend this fair and the volunteers help in crowd management, helping the old age people and maintain regulation overall.

A total of 42 volunteers helped in the fair. This event was conducted last year also with the volunteers receiving the DCP certificate by the Mumbai Police officials. They highly appreciated the students for working tirelessly for the fair.

This year was no different with the volunteers co-operating with the police.

Aman Shaikh

Community Head, TEDxCRCE

Prof. Prachi Patil

Faculty incharge, TEDxCRCE

Mumbai Police Bandra Fair Volunteering Drive

1. Aman Sheikh
2. Jaison Dsouza
3. Renjit Koshy
4. Gauravi Phansalkar
5. Davina Pinto
6. Aditya Khajuria
7. Yash Kane
8. Pragati Rao
9. Chris Crasto
10. Crystal Wilson Dsouza
11. Gary Rebello
12. Gladden Rumao
13. Sanmit Simon Dabre
14. Sakshi Ghadigaonkar
15. Calvin Leo Nunes
16. Orvell Ferreira
17. Sloan D'Cunha
18. Mounita Bhagat
19. Samantha Richard Mascarenhas
20. Lance Richard Main
21. Jain Niraj Sachin
22. Chaube Nitin Sunil
23. Lancylord Jerome D'Monte
24. Md Danish Zahid
25. Aarti Bandekar
26. Abhishek Nirmalraj
27. Dhananjay Chobhe
28. Mihir Rayganga
29. Kevin Silveira
30. Vrajesh Sunil Kutty
31. Yash Khasgiwala
32. Tijo K Thomas
33. Shresht Acharya
34. Castellino Dion Trevor Dominic
35. Anuj Purandare
36. Umang Bhavesh Kavedia
37. Aaron Fernandes
38. Alden Dsouza
39. Sakshi Dave
40. Khushi Dushyant Parikh
41. Anjana Singh

Aditya Jyot Foundation Guinness World Record

On January 26, 2019 **TEDxCRCE** participated in an event organised by **Aditya Jyot Foundation** at **Dharavi** that was a **Guinness World Record attempt for most diabetic eye screenings in 8 hours.** Our volunteers helped the organising committee for crowd management, at the registration desk and distributing food packets. A total of 30 volunteers were a part of this successful attempt. Through this attempt many people from poorer background with diabetes were able to receive a screening and check-up. With this event, TEDxCRCE continues to contribute towards the welfare of the society.

Aman Shaikh

Community Head, TEDxCRCE

Prof. Prachi Patil

Faculty incharge, TEDxCRCE

Aditya Jyot Volunteering Drive

1. Aman Sheikh
2. Jaison Dsouza
3. Davina Pinto
4. Kinjal Mhatre
5. Pragati Rao
6. Aditya Khajuria
7. Yash Kane
8. Chris Crasto
9. Manashri Mehta
10. Ishpreetkaur Dham
11. Saloni Khanna
12. Anu Thomas
13. Ninad Shetty
14. Yash Khasgiwala
15. Saptarshi Chatterjee
16. Kraig Fernandes
17. Tanmay Ghadi
18. Sakshi Dave
19. Khushi Parikh
20. Dhananjay Chobhe
21. Mareena Fernandes
22. Niraj Jain
23. Aditya Punjabi
24. Ashish Rajput
25. Arpan Sadhu
26. Steviyo Xavier Kallivalappil
27. Kishanlal Kanojia
28. Aditya Morajkar
29. Kevin Silveira
30. Vrajesh Kutty

Mumbai Roti Bank for Tata Mumbai Marathon

TEDxCRCE collaborated with **Mumbai Roti Bank**, a non-profit, food rescue organisation that bridges the gap between hunger and excess food on January 20, 2019 to distribute all the food that was left over from the 45,000 meal packets that were served to the participants of one of the most awaited marathons – The Mumbai Marathon.

A total of 26 TEDxCRCE volunteers helped to distribute these meal packets among the beneficiaries across South Mumbai. Two batches of 13 volunteers each distributed about 10,000+ meals at **Shree Manav Seva Sangh, Sion** and **Dongri Children's Home, Dongri**.

The efforts of our volunteers were greatly appreciated. We were featured on various platforms. Tata Mumbai Marathon official page tagged Roti Bank for our efforts. Mirror Now covered the entire event. The volunteers were awarded with certificates by Mumbai Roti Bank for their efforts.

We hope to contribute in more such community events aimed at serving for the society.

मुंबई ROTI BANK

D. Sivanandhan
IPS (Retd.)
Former C. P. Mumbai & D G P Maharastra

CERTIFICATE OF APPRECIATION

Dear

The Roti Foundation, Mumbai (Reg: E 34021) whole heartedly expresses gratitude to you for your kind contribution towards fighting hunger. Your generosity will surely feed those in need and supplant our battle against hunger.

We appreciate your participation with Mumbai Roti Bank in its efforts on 20th January 2019 on the occasion of food distribution from the surplus collected from The Mumbai Marathon 2019. Your dedicated efforts have assured the food reached the hunger pockets.

We look forward to your continued support in the future.

Best Regards,

D Sivanandhan, I.P.S (Retd.)
Managing Trustee,
Roti Foundation, Mumbai

ROTI FOUNDATION MUMBAI TRUSTEE

1203, One Indiabulls Centre, Tower 2B, Floor 12B, Senapati Bapat Marg, Elphinstone Road, Mumbai 400 013.

-Aman Shaikh

Community Head, TEDxCRCE

Prof. Prachi Patil

Faculty incharge, TEDxCRCE

Tata Mumbai Marathon Distribution Drive

1. Aman Sheikh
2. Jaison Dsouza
3. Gauravi Phansalkar
4. Kinjal Mhatre
5. Pragati Rao
6. Aditya Khajuria
7. Ishpreetkaur Dham
8. Gladden Rumao
9. Samantha Richard Mascarenhas
10. Sakshi Ghadigaonkar
11. Kishanlal Kanojia
12. Steviyo Xavier Kallivalappil
13. Simran Amit Biswas
14. Swini Rodrigues
15. Chelsea Moses Dabre
16. Prinkal Dabre
17. Celine D'silva
18. Niraj Jain
19. Melita Japhet
20. Saloni Khanna
21. Ninad Shetty
22. Nitin Chaube
23. Mihir Rayganga
24. Tijo K Thomas
25. Mareena Fernandes
26. Anu Thomas

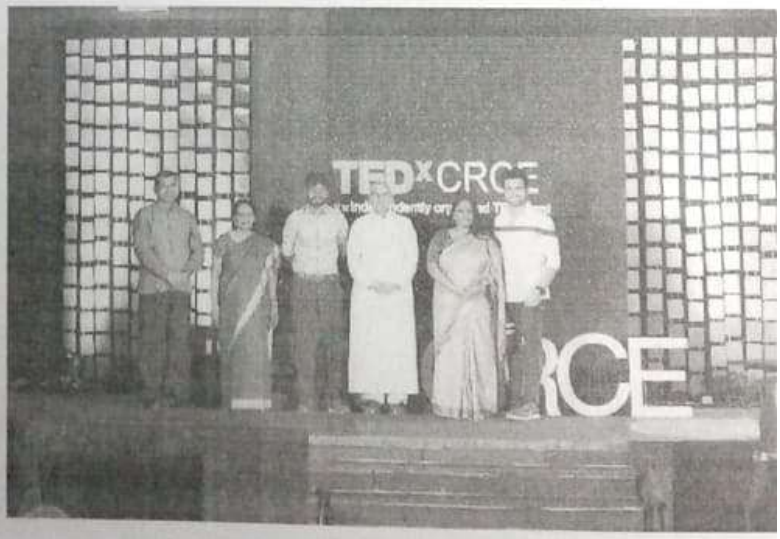
IDEAS WORTH SPREADING

On the 11th of August, 2018 TEDxCRCE hosted its 4th Edition of the Main Event in Fr. Conceicao Rodriugues College of Engineering. The theme for the event was,"REWIND": The thought that emphasises on bringing back foundations laid in the past to nurture the present and build a brighter future.

The first session kicked off with the inspiring story of Paralympic champion who won India a gold medal in 2016. A fighter who made masses believe that nothing but strong desire to overcome disabilities can be the ladder to success. Vibhas Sen is truly an inspiration. Mr. V.S. Parthasarathy the Group CFO & CIO of Mahindra & Mahindra Ltd. explained the true meaning of leadership and how a leader should be strong, vulnerable, trustworthy and most importantly friendly. The session ended with Ms. Tanvi Shukla the top news anchor at MirrorNow, bringing to light the discrepancies in today's media and how to be aware of false news that takes stage. The audiences relished the High Tea break post the first session.

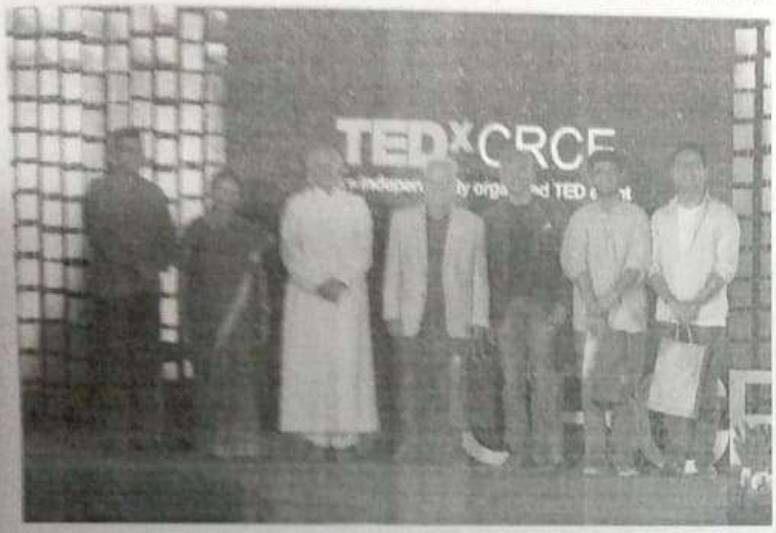
[L-R: Ms. Tanvi Shukla, Dr. Mrs. Shrija Unnikrihnan, Rev. Fr. Valerian D'souza, Rev. Fr. Peter D'souza, Mr. Vibhas Sen, Mr. V.S. Parathasarathy.]

The second session started with Ms. Bistriti Poddar, founder of The Paperless Postcards. She inspired the audience by her journey through adversities which were her stepping stones to success. The next speaker was Mr. Nimesh Shetty, a transgender activist who voiced his opinion on transgender rights and how they should be given equal opportunities to achieve their dreams. Following Mr. Nimesh was Mrs. Subarna Ghosh, Academic Activist and founder of Rerlght Foundation. She spoke on awareness of women rights and through her words motivated young women who will be future mothers to make right choices. Her talk left everyone astounded. Our last speaker for the session who is an actor and an entertainer, Mr. Rithvik Dhanjani helped the spectators embark on a journey of self-discovery. He helped us believe that each one of has our calling if we chose to look at the optimistic side of life. We then commenced our networking session.



[L-R: Rev. Fr. Valerian D'souza, Dr. Mrs. Shrija Unnikrihnan, Mr. Nimesh Shetty, Rev. Fr. Peter D'souza, Mrs. Subarna Ghosh, Mr. Rithvik Dhanjani.]

After a fruitful interactive session, Ms Aashka Goradia gave a kick start to the final session. She expressed her opinion on aesthetical procedures and why the society should embrace an individual's choices for self enhancement. The next in line was Col. Subin Balakrishnan (RETD), who has had a distinguished career at the cutting edge of combat leadership. He helped instil a sense of patriotism and leadership in the minds of the youth. Pradmashri Shri Ramesh Sippy was next to take stage. He shed light education in the field of cinematography which would help increase the quality of 21st Century films. Last but not the least Mr. Ankur and Mr. Akshay brought the stage to life with their highly acclaimed performance of 60 years of Bollywood.



[L-R: Rev. Fr. Valerian D'souza, Dr. Mrs. Shrija Unnikrihnan, Rev. Fr. Peter D'souza, Padmashri Shri Ramesh Sippy, Col. Subin Balakrishnan(RETD), Mr. Akshay and Mr. Ankur.]

We take pride in the success of the event and hope to continue TED's mission of 'Ideas Worth Spreading'. The TEDxCRCE stage will certainly continue to showcase diversity and novelty in the years to come. We thank everyone who helped and motivated us.

"Great ideas need landing gear as well as wings" and we are elated to be the platform to witness these ideas flourish.

-Organiser, TEDxCRCE

Professional Ethics

- Courses Offered in Curriculum
- Internship and Career Expo by TedxCRCE
- Resume Building Workshop
- Aptitude Training and Mock Interviews by Placement

First Year Engineering (Semester I & II), Revised course from Academic Year 2016 -17, (REV- 2016) (Common for all Branches of Engineering)

Scheme for FE - Semester – II

Sub. Code	Subject Name	Examination Scheme							
		Theory marks				Term Work	Pract.	Oral	Total
		Internal Assessment			End sem. exam				
		Test 1	Test 2	Average of Test 1 & Test 2					
FEC201	Applied Mathematics-II	20	20	20	80	25	-	-	125
FEC202	Applied Physics-II	15	15	15	60	25	-	-	100
FEC203	Applied Chemistry -II	15	15	15	60	25	-	-	100
FEC204	Engineering Drawing	15	15	15	60	25	50	-	150
FEC205	Structured Programming Approach	20	20	20	80	25	25	-	150
FEC206	Communication Skills	10	10	10	40	25	-	-	75
FEL201	Basic Workshop Practice-II	-	-	-	-	50	-	-	50
				95	380	200	75		750

Subject Code	Subject Name	Teaching Scheme			Credits Assigned			
		Theory	Pract.	Tut.	Theory	TW/Pract	Tut.	Total
FEC201	Applied Mathematics-II	04	-	01	04		01	05
FEC202	Applied Physics-II	03	01	-	03	0.5	-	3.5
FEC203	Applied Chemistry -II	03	01	-	03	0.5		3.5
FEC204	Engineering Drawing	03	04	-	03	02	-	05
FEC205	Structured Programming Approach	04	02	-	04	01	-	05
FEC206	Communication Skills	02	02	-	02	01	-	03
FEL201	Basic Workshop Practice -II	-	04	-	-	02	-	02
		19	14	01	19	07	01	27

Subject Code	Subject Name	Teaching Scheme (Contact Hours)			Credits Assigned			
		Theory	Pract	Tut.	Theory	Pract.	Tut	Total
FEC206	**Communication Skills**	02	02		02	02	01	03
		Examination Scheme						
		Theory Examination						
		Internal Assessment			End Sem. Exam	Term Work	Pract.	Oral	Total
		Test 1	Test 2	Avg.				
		10	10	10	40	25			75

COURSE OBJECTIVES:

- To acquaint the students with basic concepts, theories and barriers to communication.
- To enhance communication skills by giving adequate exposure in LSRW skills.
- To develop an overall language and communication skills for better technical writing.
- To know the essential features and mechanics of comprehension and summarization.
- To deploy technology to communicate effectively in various situations.

COURSE OUTCOMES:

The students will be able to-

- Identify, interpret and construct appropriate messages for a variety of contexts.
- Display oral and written skills in the English language in different scenarios of business communication.
- Enhance the proficiency to use appropriate language for technical writing.
- Demonstrate good comprehension, inference making, vocabulary building, paraphrasing and summarizing.

Sr. No	Module	No. of lectures
1	Communication Theory: Concept and Meaning, Communication cycle, Objectives, Barriers to communication (linguistic and semantic, psychological, physical, mechanical, cultural), Methods of communication (verbal and non-verbal), Networks of communication (formal and informal), Language skills (listening, speaking, reading, writing), Corporate communication: Digital Content Creation.	13
2	Business Correspondence: Principles of Business Correspondence, Parts of a business letter, Formats (Complete block and Modified block), Types of letters: Enquiry, Reply to enquiry, Claim, Adjustment and Sales letter.	5

3	Grammar and Vocabulary: Common errors, Concord (subject- verb agreement), Pairs of confused words, Lexicon (Enriching vocabulary through one-word substitutes, synonyms, antonyms, etc.)	2
4	Summarization and Comprehension: Passages to test the analytical skills and expression	2
5	Technical writing : Techniques to define an object, writing instructions, language exercises based on types of expositions (description of an object, explanation of a process)	2
6	Information Communication Technology (ICT) enabled communication media: E-mail, Blog and Website.	2

Note: Two tests are prescribed for internal assessment. The first test should be conducted in the form of a three-minute public speech. The second test should be based on theory and application exercises based on the syllabus.

Term work: 25 marksAssignments: 20 marks Attendance: 05 marks

List of assignments:
Communication theory: 02
Business Correspondence: 02
Grammar and vocabulary: 01
Summarization & Comprehension: 01
Technical writing: 01
ICT enabled communication media: 01

Recommended reference books, websites and journals for Communication Skills:

- ***Communication in Organizations*** **by Dalmar Fisher, Jaico Publishing House**
- ***Communication Skills*** **by Meenakshi Raman &Sangeeta Sharma, OxfordUniversity Press**
- ***Business Correspondence & Report-writing*** **by R.C.Sharma& Krishna Mohan,Tata McGraw-Hill Education**
- ***Effective Technical Communication*** **by Ashraf Rizvi, Tata McGraw-Hill**
- ***Technical Writing & Professional Communication for non-native speakers of English*** **byThomas N.Huckin& Leslie A.Olsen, McGraw -Hill**
- **Mastering Communication** ***by Nicky Stanton, Palgrave Master Series***
- **www.buisnesscommunicationskills.com**
- **www.kcitraing.com**
- **www.mindtools.com**
- **Journal of Business Communication**

Paper pattern

Total Marks: 40, Duration: 2 hours Distribution of marks and weightage:

- The paper will comprise of6 questions of 10 marks each out of which 4 need to be attempted.
- The first question is compulsory and will be a combination of all modules.
- Students can attempt any 3 out of the remaining 5 questions.
- The first module (Communication Theory) will carry 40 % weightage.
- Questions 2, 3, 4, 5 and 6 will be based on combinations of two or more modules.

T.E. (Production) Sem.-V

Course Code	Course Name	Teaching Scheme (Contact Hours)		Credits Assigned		
		Theory	Pract	Theory	Pract	Total
PEC501	Design of Mold & Metal Forming Tools	04	--	04	--	04
PEC502	Operations Research	03	--	03	--	03
PEC503	Machine Design-I	04	--	04	--	04
PEC504	CAD/CAM/CIM	04	--	04	--	04
PEC505	Metrology & Quality Engineering	04	--	04	--	04
PEDLO 501X	Department Level Optional Course I	03	--	03	--	03
PEL501	Design of Mold & Metal Forming Tools Laboratory	--	02	--	01	01
PEL502	Machine Design-I Laboratory	--	02	--	01	01
PEL503	CAD/CAM/CIM Laboratory	--	02	--	01	01
PEL504	Metrology & Quality Engg Laboratory	--	02	--	01	01
PEL505	Business Communication & Ethics	--	02*+02	--	02	02
	Total	**22**	**12**	**22**	**06**	**28**

Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Pract. /Oral	Total
		Internal Assessment			End Sem Exam	Exam. Duration (in Hrs)			
		Test1	Test 2	Avg.					
PEC501	Design of Molds & Metal Forming Tools	20	20	20	80	03	--	--	100
PEC502	Operations Research	20	20	20	80	03	--	--	100
PEC503	Machine Design-I	20	20	20	80	03	--	--	100
PEC504	CAD/CAM/CIM	20	20	20	80	03	--	--	100
PEC505	Metrology & Quality Engg.	20	20	20	80	03	--	--	100
PEDLO 501X	Department Level Optional Course I	20	20	20	80	03	--	--	100
PEL501	Design of Mold & Metal Forming Tools Laboratory	--	--	--	--	--	25	25	50
PEL502	Machine Design-I Laboratory	--	--	--	--	--	25	25	50
PEL503	CAD/CAM/CIM Laboratory	--	--	--	--	--	25	25	50
PEL504	Metrology & Quality Engg Laboratory.	--	--	--	--	--	25	25	50
PEL505	Business Communication & Ethics Laboratory						50	--	50
	Total			**120**	**480**		**150**	**100**	**850**

* **Theory for entire class to be conducted**.

Subject Code	Subject Name	Credits
PEL505	**Business Communication & Ethics**	**02**

Objectives:

1. To inculcate professional and ethical attitude at the workplace
2. To enhance effective communication and interpersonal skills
3. To build multidisciplinary approach towards all life tasks
4. To hone analytical and logical skills for problem-solving

Outcomes: Learner will be able to…

1. Design a technical document using precise language, suitable vocabulary and apt style.
2. Develop the life skills/ interpersonal skills to progress professionally by building stronger relationships.
3. Demonstrate awareness of contemporary issues knowledge of professional and ethical responsibilities.
4. Apply the traits of a suitable candidate for a job/higher education, upon being trained in the techniques of holding a group discussion, facing interviews and writing resume/SOP.
5. Deliver formal presentations effectively implementing the verbal and non-verbal skills

Modules	Detailed Content	Hours
01	**Report Writing** 1.1 Objectives of Report Writing 1.2 Language and Style in a report 1.3 Types : Informative and Interpretative (Analytical, Survey and Feasibility)and Formats of reports (Memo, Letter, Short and Long Report)	05
02	**Technical Writing** 2.1 Technical Paper Writing (IEEE Format) 2.2 Proposal Writing	03
03	**Introduction to Interpersonal Skills** 3.1 Emotional Intelligence 3.2 Leadership and Motivation 3.3 Team Building 3.4 Assertiveness 3.5 Conflict Resolution and Negotiation Skills 3.6 Time Management 3.7 Decision Making	09
04	**Meetings and Documentation** 4.1 Strategies for conducting effective meetings 4.2 Notice, Agenda and Minutes of a meeting 4.3 Business meeting etiquettes	02
05	**Introduction to Corporate Ethics** 5.1 Professional and work ethics (responsible use of social media - Facebook, WA, Twitter etc. 5.2 Introduction to Intellectual Property Rights 5.3 Ethical codes of conduct in business and corporate activities (Personal ethics, conflicting values, choosing a moral response and making ethical decisions)	02

06	**Employment Skills** 6.1 Group Discussion 6.2 Resume Writing 6.3 Interview Skills 6.4 Presentation Skills 6.5 Statement of Purpose	07

Assessment:

List of Assignments

1. Report Writing (Theory)
2. Technical Proposal
3. Technical Paper Writing (Paraphrasing a published IEEE Technical Paper)
4. Interpersonal Skills (Group activities and Role plays)
5. Interpersonal Skills (Documentation in the form of soft copy or hard copy)
6. Meetings and Documentation (Notice, Agenda, Minutes of Mock Meetings)
7. Corporate ethics (Case studies, Role plays)
8. Writing Resume and Statement of Purpose

Term Work

Term work shall consist of all assignments from the list.

The distribution of marks for term work shall be as follows:

Book Report	**10 marks**
Assignments:	**10 marks**
Project Report Presentation:	**15 marks**
Group Discussion:	**10 marks**
Attendance:	**05 marks**

References:

1. Fred Luthans, "Organizational Behavior", Mc Graw Hill,
2. Lesiker and Petit, "Report Writing for Business", Mc Graw Hill
3. R.Subramaniam, "Professional Ethics" Oxford University Press
4. Huckin and Olsen, "Technical Writing and Professional Communication", McGraw
5. Raman and Sharma, Fundamentals of Technical Communication, Oxford University Press
6. Hill Wallace and Masters, "Personal Development for Life and Work", Thomson Learning, 12th Edition
7. Heta Murphy, "*Effective Business Communication*" , Mc Graw Hill, edition
8. R.C Sharma and Krishna Mohan, "*Business Correspondence and Report Writing",*
9. Raman Sharma, *Communication Skills*, Oxford University Press
10. B N Ghosh, "*Managing Soft Skills for Personality Development*", Tata McGraw Hill Lehman,
11. Dufrene, Sinha, "*BCOM*", Cengage Learning, 2nd edition
12. Bell . Smith, "Management Communication" Wiley India Edition, 3rd edition.
13. Dr. K. Alex ,"Soft Skills", S Chand and Company
14. Robbins Stephens P., "Organizational Behavior", Pearson Education
15. https://grad.ucla.edu/asis/agep/advsopstem.pdf

Course Code	Course Name	Credits
CSL505	**Business Communication & Ethics**	**02**

Course Objectives:

1. To inculcate professional and ethical attitude at the work place
2. To enhance effective communication and interpersonal skills
3. To build multidisciplinary approach towards all life tasks
4. To hone analytical and logical skills for problem-solving.

Course Outcomes: Learner will be able to…

1. Design a technical document using precise language, suitable vocabulary and apt style.
2. Develop the life skills/interpersonal skills to progress professionally by building stronger relationships.
3. Demonstrate awareness of contemporary issues knowledge of professional and ethical responsibilities.
4. Apply the traits of a suitable candidate for a job/higher education , upon being trained in the techniques of holding a group discussion, facing interviews and writing resume/SOP.
5. Deliver formal presentations effectively implementing the verbal and non-verbal skills

Module	Detailed Contents	Hrs.
01	**Report Writing**	**05**
1.1	Objectives of Report Writing	
1.2	Language and Style in a report	
1.3	Types: Informative and Interpretative (Analytical, Survey and Feasibility) and Formats of reports(Memo, Letter, Short and Long Report)	
02	**Technical Writing**	**03**
2.1	Technical Paper Writing(IEEE Format)	
2.2	Proposal Writing	
03	**Introduction to Interpersonal Skills**	**09**
3.1	Emotional Intelligence	
3.2	Leadership and Motivation	
3.3	Team Building	
3.4	Assertiveness	
3.5	Conflict Resolution and Negotiation Skills	
3.6	Time Management	
3.7	Decision Making	
04	**Meetings and Documentation**	**02**
4.1	Strategies for conducting effective meetings	
4.2	Notice, Agenda and Minutes of a meeting	
4.3	Business meeting etiquettes	
05	**Introduction to Corporate Ethics**	**02**
5.1	Professional and work ethics (responsible use of social media Facebook, WA, Twitter etc.)	
5.2	Introduction to Intellectual Property Rights	
5.4	Ethical codes of conduct in business and corporate activities (Personal ethics, conflicting values, choosing a moral response and making ethical decisions)	

06	**Employment Skills**	**07**
6.1	Group Discussion	
6.2	Resume Writing	
6.3	Interview Skills	
6.4	Presentation Skills	
6.5	Statement of Purpose	
		28

Assessment:

List of Assignments

1. Report Writing(Theory)
2. Technical Proposal
3. Technical Paper Writing(Paraphrasing a published IEEE Technical Paper)
4. Interpersonal Skills(Group activities and Role plays)
5. Interpersonal Skills(Documentation in the form of soft copy or hard copy)
6. Meetings and Documentation(Notice, Agenda, Minutes of Mock Meetings)
7. Corporate ethics(Case studies, Role plays)
8. Writing Resume and Statement of Purpose

Term Work

Term work shall consist of all assignments from the list. The distribution of marks for term work shall be as follows:

Book Report	**10 marks**
Assignments:	**10 marks**
Project Report Presentation:	**15 marks**
Group Discussion:	**10 marks**
Attendance:	**05 marks**

References:

1. Fred Luthans,“ Organizational Behavior”, Mc GrawHill,
2. Lesiker and Petit,“ Report Writing for Business ”,McGrawHill
3. R. Subramaniam,“ Professional Ethics” Oxford University Press
4. Huckin and Olsen, “Technical Writing and Professional Communication ”,McGraw
5. Raman and Sharma,FundamentalsofTechnicalCommunication,OxfordUniversityPress
6. Hill Wallace and Masters,“ Personal Development for Life and Work”, Thomson Learning.
7. Heta Murphy,“ *Effective Business Communication* ”,McGraw Hill, edition
8. R.C Sharma and Krishna Mohan,“ *Business Correspondence and Report Writing”,*
9. Raman Sharma, ”*Communication Skills”*, Oxford University Press
10. B N Ghosh,“ *Managing Soft Skills for Personality Development* ”,Tata McGraw Hill
11. Dufrene, Sinha,“*BCOM*”, Cengage Learning, 2ndedition
12. Bell. Smith,“ManagementCommunication”WileyIndiaEdition,3rdedition.
13. Dr. K. Alex, “Soft Skills”, S Chand and Company
14. Robbins Stephens P., “Organizational Behavior”, Pearson Education
15. https://grad.ucla.edu/asis/agep/advsopstem.pdf

		function in the function, Checking & Setting Your Parameters, Calling Functions from within Other Functions, Functions Inside of Functions, Layers of Functions **Lab Experiment:** Write python programs to understand different decision making statements and Functions. (Minimum Three Programs based on Decision making, Looping Statements and Functions)		
III	Object Oriented Programming using Python programming	**Theory:** Creating a Class, Self Variables, Constructors, Types of Methods, Inner Classes, Constructors in Inheritance, Polymorphism,, The super() Method, Method Resolution Order (MRO), Operator Overloading, Method Overloading & Overriding, Interfaces in Python. Exceptions Handling: Errors in a Python Program, Exceptions, Exception Handling, Types of Exceptions, The Except Block, The assert Statement. Modules and Packages: Creating Modules and Packages, Documenting & Viewing Module, Basics of Testing Your Modules and Packages, Importing & exporting Modules. **Lab Experiment:** Write python programs to understand different Object oriented features in Python (Minimum four programs based on a) Classes & objects,	10	LO 3

Course Code	Course Name	Theory	Practical	Tutorial	Theory	TW/ Practical	Tutorial	Total
ITL505	Business Communication and Ethics	2	2*	--	--	2	--	2

Course Code	Course Name	Examination Scheme							
		Theory Marks				Term Work	Oral & Practical	Oral	Total
		Internal assessment			End Sem. Exam				
		Test1	Test2	Avg. of two Tests					
ITL505	Business Communication and Ethics	--	--	--	--	50	--	--	50

* Batch wise practical's

Pre-requisite

- Communication Skills

Course Objective: Students will try:

1. To inculcate professional and ethical attitude at the workplace
2. To enhance effective communication and interpersonal skills
3. To build multidisciplinary approach towards all life tasks
4. To hone analytical and logical skills for problem-solving

Course Outcomes: Students will learn to:

1. Design a technical document using precise language, suitable vocabulary and apt style.
2. Develop the life skills/ interpersonal skills to progress professionally by building stronger relationships.
3. Demonstrate awareness of contemporary issues knowledge of professional and ethical responsibilities.
4. Apply the traits of a suitable candidate for a job/higher education, upon being trained in the techniques of holding a group discussion, facing interviews and writing resume/SOP.
5. Deliver formal presentations effectively implementing the verbal and non-verbal skills.

Module	Detailed Contents	Hrs.
01	**Report Writing**	**05**
1.1	Objectives of Report Writing	
1.2	Language and Style in a report	
1.3	Types : Informative and Interpretative (Analytical, Survey and Feasibility)and Formats of reports (Memo, Letter, Short and Long Report)	
02	**Technical Writing**	**03**
2.1	Technical Paper Writing (IEEE Format)	
2.2	Proposal Writing	
03	**Introduction to Interpersonal Skills**	**08**
3.1	Emotional Intelligence	
3.2	Leadership and Motivation	
3.3	Team Building	
3.4	Assertiveness	
3.5	Conflict Resolution and Negotiation Skills	
3.6	Time Management	
3.7	Decision Making	
04	**Meetings and Documentation**	**02**
4.1	Strategies for conducting effective meetings	
4.2	Notice, Agenda and Minutes of a meeting	
4.3	Business meeting etiquettes	
05	**Introduction to Corporate Ethics**	**02**
5.1	Professional and work ethics (responsible use of social media - Facebook, WA, Twitter etc.)	
5.2	Introduction to Intellectual Property Rights	
5.4	Ethical codes of conduct in business and corporate activities (Personal ethics, conflicting values, choosing a moral response and making ethical decisions)	
06	**Employment Skills**	**06**

6.1	Group Discussion	
6.2	Resume Writing	
6.3	Interview Skills	
6.4	Presentation Skills	
6.5	Statement of Purpose	
		26

1. Report Writing (Theory)
2. Technical Proposal
3. Technical Paper Writing (Paraphrasing a published IEEE Technical Paper)
4. Interpersonal Skills (Group activities and Role plays)
5. Interpersonal Skills (Documentation in the form of soft copy or hard copy)
6. Meetings and Documentation (Notice, Agenda, Minutes of Mock Meetings)
7. Corporate ethics (Case studies, Role plays)
8. Writing Resume and Statement of Purpose

1. **Term Work:**
2. Term work shall consist of all assignments from the list. The distribution of marks for term
3. work shall be as follows:
4. Book Report……..(10) Marks
5. Assignments …… (10) Marks
6. Project Report Presentation…….. (15) Marks
7. Group Discussion…… (10) Marks
8. Attendance ……(05) Marks
9. **TOTAL: ……(50) Marks**

The final certification and acceptance of term work ensures the satisfactory performance of work assigned and minimum passing in the term work.

References

1. Fred Luthans, *"Organizational Behavior",* McGraw Hill, edition
2. Lesiker and Petit, *"Report Writing for Business",* McGraw Hill, edition
3. Huckin and Olsen, *"Technical Writing and Professional Communication",* McGraw Hill

4. Wallace and Masters, *"Personal Development for Life and Work",* Thomson Learning, 12th edition
5. Heta Murphy*, "Effective Business Communication",* Mc Graw Hill, edition
6. Sharma R.C. and Krishna Mohan, *"Business Correspondence and Report Writing",* Tata McGraw-Hill Education
7. Ghosh, B. N., *"Managing Soft Skills for Personality Development",* Tata McGraw Hill. Lehman,
8. Dufrene, Sinha, "BCOM", Cengage Learning, 2nd edition
9. Bell, Smith, "Management Communication" Wiley India Edition, 3rd edition.
10. Dr. Alex, K., "Soft Skills", S Chand and Company
11. Subramaniam, R., "Professional Ethics" Oxford University Press.
12. Robbins Stephens P., "Organizational Behavior", Pearson Education
13. https://grad.ucla.edu/asis/agep/advsopstem.pdf

T.E. (Electronics Engineering) – Semester V

Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	Practical	Tutorial	Total
ELX501	Microcontrollers and Applications	04	--	---	04	---	---	04
ELX 502	Digital Communication	04	-	--	04	---	---	04
ELX 503	Engineering Electromagnetics	04	-	@01	04	---	01	05
ELX 504	Design with Linear Integrated Circuits	04	02	---	04	---	---	04
ELX 505	Business Communication & Ethics	02	02#		---	02	---	02
ELXDLO501X	Department Level optional courses I	04	02	---	04		---	04
ELXL501	Microcontrollers and Applications Lab.					01	---	01
ELXL502	Digital Communication Lab.					01	---	01
ELXL503	Design with Linear Integrated Circuits Lab.					01	---	01
ELX DLOl50X	Department Level optional course-I Lab					01	---	01
	TOTAL	**20**	**08**	**04**	**20**	**06**	**01**	**27**

1 hour tutorial class-wise #02 hours batch-wise

Course Code	Course Name	Examination Scheme – Semester V							
		Theory					Term Work	Oral /Prac	Total
		Internal Assessment (IA)			End Sem Exam Marks	Exam Duration (Hours)			
		Test I	Test II	AVG.					
ELX501	Micro-controllers and Applications	20	20	20	80	03	---	---	100
ELX 502	Digital Communication	20	20	20	80	03	---	---	100
ELX 503	Engineering Electromagnetics	20	20	20	80	03	25	---	125
ELX 504	Design with Linear Integrated Circuits	20	20	20	80	03	---	---	100
ELX 505	Business Communication & Ethics	---	---	---	---	---	50	---	50
ELX DLO501X	Department Level Elective-I	20	20	20	80	03	---	---	100
ELXL501	Micro-controllers and Applications Lab.						25	25	50
ELXL 502	Digital Communication Lab.						25	25	50
ELXL 503	Design with Linear Integrated Circuits Lab.						25	25	50
ELXL DLO501X	Department Elective I lab						25	25	50
Total		**100**	**100**	**100**	**400**	**15**	**175**	**100**	**775**

Course Code	Department Level Optional Course I
ELXDLO5011	Database and Management System
ELXDLO5012	Digital Control system
ELXDLO5013	ASIC Verification
ELXDLO5014	Biomedical Instrumentation

B. E. (Production) Sem.-VIII

Course Code	Course Name	Teaching Scheme (Contact Hours)		Credits Assigned		
		Theory	Pract.	Theory	Pract.	Total
PEC801	Automation and Control Engineering	4	2	4	1	5
PEC802	Computer Aided Manufacturing	4	2	4	1	5
PEC803	Engineering Economics, Finance, Accounting and Costing	4	--	4	--	4
PEC804	Total Quality Strategy	4	2	4	1	5
PEC805	Industrial relations and Human Resource Management	4	--	4	--	4
PEE801X	Elective-I	3	2	3	1	4
	TOTAL	**23**	**08**	**23**	**4**	**27**

Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Pract./ Oral	Total
		Internal Assessment			End Sem. Exam.	Exam. Duration (in Hrs)			
		Test1	Test2	Avg.					
PEC801	Automation and Control Engineering	20	20	20	80	03	25	25	150
PEC802	Computer Aided Manufacturing	20	20	20	80	03	25	25	150
PEC803	Engineering Economics, Finance, Accounting and Costing	20	20	20	80	03	--	--	100
PEC804	Total Quality Strategy	20	20	20	80	03	25	25*	150
PEC805	Industrial Relations and Human Resource Management	20	20	20	80	03	--	---	100
PEE801X	Elective-I	20	20	20	80	03	25	--	125
Total		**--**	**--**	**120**	**480**	**--**	**100**	**75**	**775**

*** Only ORAL examination based on term work and syllabus**

List of Electives

Course codes	Course Name	Course codes	Course Name
PEE8011	Sales and Marketing Management	PEE8016	Mechatronics
PEE8012	Logistics and Supply Chain Management	PEE8017	Industrial Robotics
PEE8013	Plastics Engineering	PEE8018	Product Design and Development
PEE8014	Entrepreneurship Development	PEE8019	Sustainable Engineering
PEE8015	World Class Manufacturing	PEE80110	Maintenance Engineering

Course Code	Course/Subject Name	Credits
PEC805	**Industrial Relations and Human Resource Management**	**4**

Objectives

1. To get an **e**xposure to aspects pertaining to human resource and its relevance in industry.
2. To focus on the behavioral aspects and industrial relations.

Outcomes: Learner will be able to…

1. Appreciate human resource as the most vital resource of an organization.
2. Develop skills in identifying, planning, and deploying of man power.
3. Develop inter personal and communication skills.
4. Develop skills in identifying training needs of employs at different levels.

Module	Details	Hrs.
01	**Evolution and Developments of thought** Evolution of managements thought, behavioral, contingency and Contemporary management approach. **Organization structure** Definition, need, types of organizational responsibility, authority, accountability, delegation and span of control.	**08**
02	**Decision Making** Types of decision, steps in rational decision making. **Functions of personnel Management** Managerial and operative functions.	**06**
03	**Communication** Significance of communication, Principles of effective communication and Barriers of communication. **Leaderships** Different styles of leadership and their suitability, Empowering employees and Manager as a leader.	**10**
04	**Human Behavior** Perception, attitude, Groups, Types of groups, Groups behavior, Morale and Job satisfaction. **Motivation** Theories of Motivation, Job design, Job enlargement and enrichment, Difference between manipulation & motivation and Performance appraisals.	**06**
05	**Human resource development** 5.1 Human resource planning, Job description, Job analysis and job evaluation, Recruitment and selection procedure. 5.2 Training and Development: Concepts and difference between training and development, Identification of training needs at different levels, Methods, Steps and Types of training. 5.3 Promotion: Basis for promotion and their merits and demerits. 5.4 Retaining of human resource: 5.6 Safety, steps in safety programme, Occupational hazards, and Accident prevention..	**12**

06	**Compensation and salary Administration:** 6.1 Factory act, Industrial dispute act, Salary and wage fixation and Workman's compensation act. 6.2 Employee grievances, Machinery for addressing grievances, Collective bargaining, Industrial relations, Trade unions and managing Conflicts.	**06**

Internal Assessment

Assessment consists of two tests out of which; one should be compulsory class test (on minimum 40% of curriculum) and the other is either a class test (on minimum 70% of curriculum) or assignment on live problems or course project.

Theory Examination

In question paper, weightage of each module will be proportional to number of respective lecture hours as mention in the syllabus.

1. Question paper will comprise of 6 questions, each carrying 20 marks.
2. Question number 1 will be compulsory and based on maximum contents of the syllabus
3. Remaining questions will be mixed in nature (for example, if Q.2 has part (a) from module 3 then part (b) will be from other than module 3)
4. Total four questions need to be solved.

References

1. *Personnel Management and Human Resources,* C.S. Venkataratnam, B,K, Srivastava
2. *Principles of Management*, P.C. Tripathi, P.N. Reddy
3. *Industrial and Business Management*, Martand T. Teslang
4. *Organization Behavior, Text and cases*, Uma Sekram
5. *Oraganizational Behavior,* F. Luthans
6. *Personnel Management*, C.B. Memoria.
7. *Factory Administration and Management*, A.S.Deshpande.
8. *The Change in world of the Executive*, Peter Drucker.
9. *In search of excellence,* Tom Peter and R, H.Waterman Harper.

Program Structure B.E. Computer Engineering, (Rev. 2016) w.e.f. AY 2018-19

T. E. Computer Engineering (Semester-VI)

Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned			
		Theory	Pract	Tut	Theory	TW/ Pract	Tut	Total
CSC601	Software Engineering	4	-	-	4	-	-	4
CSC602	System Programming & Complier Construction	4	-	-	4	-	-	4
CSC603	Data Warehousing & Mining	4	-	-	4	-	-	4
CSC604	Cryptography & System Security	4	-	-	4	-	-	4
CSDLO 601X	Department Level Optional Course -II	4	-	-	4	-	-	4
CSL601	Software Engineering Lab	-	2	-	-	1	-	1
CSL602	System software Lab	-	2	-	-	1	-	1
CSL603	Data Warehousing & Mining Lab	-	2	-	-	1	-	1
CSL604	System Security Lab	-	2	-	-	1	-	1
CSP605	Mini-Project	-	4	-	-	2	-	2
	Total	**20**	**12**	-	**20**	**6**	-	**26**

Course Code	Course Name	Examination Scheme								
		Theory					TW	Oral	Oral & Pract	Total
		Internal Assessment			End Sem. Exam	Exam Duration (in Hrs)				
		Test 1	Test 2	Avg.						
CSC601	Software Engineering	20	20	20	80	3	-	-	-	100
CSC602	System Programming & Complier Construction	20	20	20	80	3	-	-	-	100
CSC603	Data Warehousing & Mining	20	20	20	80	3	-	-	-	100
CSC604	Cryptography & System Security	20	20	20	80	3	-	-	-	100
CSDLO 601X	Department Level Optional Course -II	20	20	20	80	3	-	-	-	100
CSL601	Software Engineering Lab	-	-	-	-	-	25	25	--	50
CSL602	System Software Lab	-	-	-	-	-	25	--	25	50
CSL603	Data Warehousing & Mining Lab	-	-	-	-	-	25	--	25	50
CSL604	System Security Lab	-	-	-	-	-	25	---	25	50
CSP605	Mini-Project	-	-	-	-	-	25	---	25	50
Total		100	100	100	400	-	125	25	100	750

Course Code	Course Name	Credits
CSC601	Software Engineering	4

Course objectives:

The main objective of the course is to introduce to the students about the product that is to be engineered and the processes that provides a framework for the engineering methodologies and practices.

1. To provide the knowledge of software engineering discipline.
2. To apply analysis, design and testing principles to software project development.
3. To demonstrate and evaluate real time projects with respect to software engineering principles.

Course outcomes:

On successful completion of course, learners will be able to:

1. Understand and demonstrate basic knowledge in software engineering.
2. Identify requirements, analyze and prepare models.
3. Plan, schedule and track the progress of the projects.
4. Design & develop the software projects.
5. Identify risks, manage the change to assure quality in software projects.
6. Apply testing principles on software project and understand the maintenance concepts.

Prerequisite:

1. Concepts of Object Oriented Programming & Methodology
2. Knowledge of developing applications with front end & back end connectivity.

Course syllabus:

Module No.	Unit No.	Topics	Hrs.
1.0		**Introduction To Software Engineering and Process Models**	08
	1.1	Nature of Software, Software Engineering, Software Process, Capability Maturity Model (CMM)	
	1.2	Generic Process Model, **Prescriptive Process Models:** The Waterfall Model, V-model, Incremental Process Models, Evolutionary Process Models, Concurrent Models, Agile process, Agility Principles, Extreme Programming (XP), Scrum, Kanban model	
2.0		**Requirements Analysis and Modelling**	08
	2.1	Requirement Elicitation, Software requirement specification (SRS), Developing Use Cases (UML)	
	2.2	Requirement Model – Scenario-based model, Class-based model, Behavioural model.	
3.0		**Project Scheduling and Tracking**	08
	3.1	Management Spectrum, 3Ps (people, product and process)	
	3.2	Process and Project metrics	

	3.3	**Software Project Estimation:** LOC, FP, Empirical Estimation Models - COCOMO II Model, Specialized Estimation Techniques	
	3.4	**Project scheduling:** Defining a Task Set for the Software Project, Timeline charts, Tracking the Schedule, Earned Value Analysis	
4.0		**Software Design**	**10**
	4.1	Design Principles, Design Concepts, Effective Modular Design – Cohesion and Coupling	
	4.2	Architectural Design	
	4.3	Component-level design	
	4.4	User Interface Design	
5.0		**Software Risk, Configuration Management & Quality Assurance**	**08**
	5.1	Risk Identification, Risk Assessment, Risk Projection, RMMM	
	5.2	Software Configuration management, SCM repositories, SCM process	
	5.3	Software Quality Assurance Task and Plan, Metrics, Software Reliability, Formal Technical Review (FTR), Walkthrough	
6.0		**Software Testing and Maintenance**	**10**
	6.1	Strategic Approach to Software Testing, Unit testing, Integration testing Verification, Validation Testing, System Testing	
	6.2	Software Testing Fundamentals, White-Box Testing , Basis Path Testing, Control Structure Testing, Black-Box Testing,	
	6.3	Software maintenance and its types, Software Re-engineering, Reverse Engineering	
		Total	**52**

Internal Assessment:
Assessment consists of two class tests of 20 marks each. The first class test is to be conducted when approx. 40% syllabus is completed and second class test when additional 40% syllabus is completed. Duration of each test shall be one hour.

End Semester Theory Examination:
1. Question paper will comprise of 06 questions, each carrying 20 marks.
2. The students need to solve total 04 questions.
3. Question No.1 will be compulsory and based on entire syllabus.
4. Remaining questions (Q.2 to Q.6) will be selected from all the modules.

Text Books:
1. Roger Pressman, “Software Engineering: A Practitioner’s Approach",McGraw-Hill Publications 2. Ian Sommerville, “Software Engineering”, Pearson Education (9th edition)
3. Ali Behfrooz and Fredeick J.Hudson, "Software Engineering Fundamentals", Oxford University Press

Reference Books:
1. Ugrasen Suman, “Software Engineering – Concepts and Practices”, Cengage Learning
2. Pankaj Jalote, "An integrated approach to Software Engineering", Springer/Narosa
3. Jibitesh Mishra and Ashok Mohanty, “Software Engineering”, Pearson
4. Rajib Mall, "Fundamentals of Software Engineering", Prentice Hall India

Course Code	Course Name	Credits
CSC604	Cryptography and System Security	4

Course Objectives:

1. To introduce classical encryption techniques and concepts of modular arithmetic and number theory.
2. To explore the working principles and utilities of various cryptographic algorithms including secret key cryptography, hashes and message digests, and public key algorithms
3. To explore the design issues and working principles of various authentication protocols, PKI standards and various secure communication standards including Kerberos, IPsec, and SSL/TLS and email.
4. To develop the ability to use existing cryptographic utilities to build programs for secure communication.

Course Outcomes: At the end of the course learner will able to

1. Understand system security goals and concepts, classical encryption techniques and acquire fundamental knowledge on the concepts of modular arithmetic and number theory.
2. Understand, compare and apply different encryption and decryption techniques to solve problems related to confidentiality and authentication
3. Apply the knowledge of cryptographic checksums and evaluate the performance of different message digest algorithms for verifying the integrity of varying message sizes.
4. Apply different digital signature algorithms to achieve authentication and design secure applications
5. Understand network security basics, analyze different attacks on networks and evaluate the performance of firewalls and security protocols like SSL, IPSec, and PGP.
6. Analyze and apply system security concept to recognize malicious code.

Detailed Syllabus:

Module No	Unit No	Detailed Content	Hrs
1	**Introduction & Number Theory**		10
	1.1	Security Goals, Services, Mechanisms and attacks, The OSI security architecture, Network security model, Classical Encryption techniques, Symmetric cipher model, mono-alphabetic and poly-alphabetic substitution techniques: Vigenere cipher, playfair cipher, Hill cipher, transposition techniques: keyed and keyless transposition ciphers, steganography.	
	1.2	Modular Arithmetic and Number Theory:- Euclid's algorithm-–Prime numbers-Fermat's and Euler's theorem- Testing for primality -The Chinese remainder theorem, Discrete logarithms.	
2	**Symmetric and Asymmetric key Cryptography and key Management**		12

	2.1	Block cipher principles, block cipher modes of operation, DES, Double DES, Triple DES, Advanced Encryption Standard (AES), Stream Ciphers: RC5 algorithm.	
	2.2	Public key cryptography: Principles of public key cryptosystems-The RSA algorithm, The knapsack algorithm, ElGamal Algorithm.	
	2.3	Key management techniques: using symmetric and asymmetric algorithms and trusted third party. Diffie Hellman Key exchange algorithm.	
3	**Hashes, Message Digests and Digital Certificates**		06
	3.1	Cryptographic hash functions, Properties of secure hash function, MD5, SHA-1, MAC, HMAC, CMAC.	
	3.2	Digital Certificate: X.509, PKI	
4	**Authentication Protocols & Digital signature schemes**		08
	4.1	User Authentication and Entity Authentication, One-way and mutual authentication schemes, Needham Schroeder Authentication protocol, Kerberos Authentication protocol.	
	4.2	Digital Signature Schemes – RSA, EIGamal and Schnorr signature schemes.	
5	**Network Security and Applications**		10
	5.1	Network security basics: TCP/IP vulnerabilities (Layer wise), Packet Sniffing, ARP spoofing, port scanning, IP spoofing, TCP syn flood, DNS Spoofing.	
	5.2	Denial of Service: Classic DOS attacks, Source Address spoofing, ICMP flood, SYN flood, UDP flood, Distributed Denial of Service, Defenses against Denial of Service Attacks.	
	5.3	Internet Security Protocols: SSL, IPSEC, Secure Email: PGP, Firewalls, IDS and types, Honey pots	
6	**System Security**		06
	6.1	Software Vulnerabilities: Buffer Overflow, Format string, cross-site scripting, SQL injection, Malware: Viruses, Worms, Trojans, Logic Bomb, Bots, Rootkits.	

Text Books:

1. William Stallings, Cryptography and Network Security, Principles and Practice, 6th Edition, Pearson Education, March 2013
2. Behrouz A. Ferouzan, "Cryptography & Network Security", Tata Mc Graw Hill
3. Bernard Menezes, "Cryptography & Network Security", Cengage Learning.
4. Network Security Bible, Eric Cole, Second Edition, Wiley.

Reference Books:

1. Applied Cryptography, Protocols Algorithms and Source Code in C, Bruce Schneier, Wiley.
2. Cryptography and Network Security, Atul Kahate, Tata Mc Graw Hill.

Assessment:

Internal Assessment:

Assessment consists of two class tests of 20 marks each. The first class test is to be conducted when approx. 40% syllabus is completed and second class test when additional 40% syllabus is completed. Duration of each test shall be one hour.

Theory Examination:

1. Question paper will comprise of total six questions.
2. All question carry equal marks
3. Questions will be mixed in nature (for example supposed Q.2 has part (a) from module 3 then part (b) will be from any module other than module 3)
4. Only Four question need to be solved.

In question paper weightage of each module will be proportional to number of respective lecture hours as mentioned in the syllabus.

University of Mumbai

Program Structure B.E. Information Technology, (Rev. 2016)

T. E. Information Technology (Semester-V)

Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned			
		Theory	Pract	Tut	Theory	TW/ Pract	Tut	Total
ITC501	Microcontroller and Embedded Programming	4	-	-	4	-	-	4
ITC502	Internet Programming	4	-	-	4	-	-	4
ITC503	Advanced Data Management Technology	4	-	-	4	-	-	4
ITC504	Cryptography & Network Security	4	-	-	4	-	-	4
ITDLO-I	Department Level Optional Course-I	4	-	-	4	-	-	4
ITL501	Internet Programming Lab	-	2	-	-	1		1
ITL502	Security Lab	-	2	-	-	1	-	1
ITL503	OLAP Lab	-	2	-	-	1	-	1
ITL504	IOT (Mini Project) Lab	-	2	-	-	1	-	1
ITL505	Business Communication and Ethics	-	2+2*	-	-	2	-	2
	Total	**20**	**14**	-	**20**	**7**	-	**26**

Course Code	Course Name	Examination Scheme								
		Theory					TW	Oral	Oral & Pract	Total
		Internal Assessment			End Sem. Exam	Exam Duration (in Hrs)				
		Test 1	Test 2	Avg.						
ITC501	Microcontroller and Embedded Programming	20	20	20	80	3	-		-	100
ITC502	Internet Programming	20	20	20	80	3	-		-	100
ITC503	Advanced Data Management Technology	20	20	20	80	3	-		-	100
ITC504	Cryptography & Network Security	20	20	20	80	3	-		-	100
ITDLO-I	Department Level Optional Course-I	20	20	20	80	3	--		-	100
ITL501	Internet Programming Lab	-	-	-	-	-	25	--	25	50
ITL502	Security Lab	-	-	-	-	-	25	25	--	50
ITL503	OLAP Lab	-	-	-	-	-	25	25	--	50

Course Code	Course Name	Theory	Practical	Tutorial	Theory	Oral & Practical	Tutorial	Total
ITC504	Cryptography & Network Security	04	--	--	04	--	--	04

Course Code	Course Name	Examination Scheme							
		Theory Marks				Term Work	Oral & Practical	Oral	Total
		Internal assessment			End Sem. Exam				
		Test 1	Test2	Avg. of two Tests					
ITC504	Cryptography & Network Security	20	20	20	80	--	--	--	100

Course Objectives: Students will try to learn:

1. The concepts of classical encryption techniques and concepts of finite fields and number theory.
2. And explore the working principles and utilities of various cryptographic algorithms including secret key cryptography, hashes and message digests, and public key algorithms
3. And explore the design issues and working principles of various authentication protocols, PKI standards.
4. And explore various secure communication standards including Kerberos, IPsec, and SSL/TLS and email.
5. The ability to use existing cryptographic utilities to build programs for secure communication.
6. The concepts of cryptographic utilities and authentication mechanisms to design secure applications

Course Outcomes: Students will be able to:

1. Identify information security goals, classical encryption techniques and acquire fundamental knowledge on the concepts of finite fields and number theory.
2. Understand, compare and apply different encryption and decryption techniques to solve problems related to confidentiality and authentication
3. Apply the knowledge of cryptographic checksums and evaluate the performance of different message digest algorithms for verifying the integrity of varying message sizes
4. Apply different digital signature algorithms to achieve authentication and create secure applications
5. Apply network security basics, analyze different attacks on networks and evaluate the performance of firewalls and security protocols like SSL, IPSec, and PGP.
6. Apply the knowledge of cryptographic utilities and authentication mechanisms to design secure applications

Prerequisite: Computer Networks

Detailed syllabus:

Sr No	Module	Detailed Content	Hours	CO Mapping
0	Prerequisites	Basic concepts of OSI Layer	02	--
I	Introduction & Number Theory	Services, Mechanisms and attacks-the OSI security architecture-Network security model-Classical Encryption techniques (Symmetric cipher model, mono-alphabetic and poly-alphabetic substitution techniques: Vignere cipher, playfair cipher, Hill cipher, transposition techniques: keyed and keyless transposition ciphers, steganography).	09	CO1
II	Block Ciphers & Public Key Cryptography	Data Encryption Standard-Block cipher principles-block cipher modes of operation-Advanced Encryption Standard (AES)-Triple DES-Blowfish-RC5 algorithm. Public key cryptography: Principles of public key cryptosystems-The RSA algorithm, The knapsack algorithm, El-Gamal Algorithm. Key management – Diffie Hellman Key exchange	09	CO2 CO6
III	Cryptographic Hashes, Message Digests and Digital Certificates	Authentication requirement – Authentication function , Types of Authentication, MAC – Hash function – Security of hash function and MAC –MD5 – SHA – HMAC – CMAC, Digital Certificate: X.509, PKI	09	CO3
IV	Digital signature schemes and authentication Protocols	Digital signature and authentication protocols : Needham Schroeder Authentication protocol, Digital Signature Schemes – RSA, EI Gamal and Schnorr, DSS.	07	CO4
V	Network Security	Network security basics: TCP/IP vulnerabilities (Layer wise), Packet Sniffing, ARP spoofing, port scanning, IP spoofing, TCP syn flood, DNS Spoofing. Denial of Service: Classic DOS attacks, Source Address spoofing, ICMP flood, SYN flood, UDP flood, Distributed Denial of Service, Defenses against Denial of Service Attacks.	10	CO5

		Firewalls, Intrusion Detection Systems: Host Based and Network Based IDS, Honey pots.		
VI	Network Security Applications	Authentication Applications, Kerberos, Internet Security Protocols: SSL, TLS, IPSEC:AH, ESP, Secure Email: PGP and S/MIME, Key Management.	06	CO5 CO6

Text Books:

1. Mark Stamp's Information Security Principles and Practice, Wiley
2. William Stallings, Cryptography and Network Security, Principles and Practice, 6th Edition, Pearson Education, March 2013
3. Behrouz A. Ferouzan, "Cryptography & Network Security", Tata Mc Graw Hill
4. Bernard Menezes, "Cryptography & Network Security", Cengage Learning

Reference Books:

1. Applied Cryptography, Protocols Algorithms and Source Code in C, Bruce Schneier, Wiley.
2. Cryptography and Network Security, Atul Kahate, Tata Mc Graw Hill.

Assessment:

Internal Assessment for 20 marks:
Consisting of **Two Compulsory Class Tests**
Approximately 40% to 50% of syllabus content must be covered in First test and remaining 40% to 50% of syllabus contents must be covered in second test.

End Semester Examination: Some guidelines for setting the question papers are as:

- Weightage of each module in end semester examination is expected to be/will be proportional to number of respective lecture hours mentioned in the syllabus.
- Question paper will comprise of total **six questions**, **each carrying 20 marks.**
- **Q.1** will be **compulsory** and should **cover maximum contents of the syllabus**.
- **Remaining question will be mixed in nature** (for example if Q.2 has part (a) from module 3 then part (b) will be from any other module. (Randomly selected from all the modules.)
- Total **four questions** need to be solved.

Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned			
		Theory	Pract	Tut	Theory	TW/ Pract	Tut	Total
ITC601	Software Engineering with Project Management	4	-	-	4	-	-	4
ITC602	Data Mining and Business Intelligence	4	-	-	4	-	-	4
ITC603	Cloud Computing & Services	4	-	-	4	-	-	4
ITC604	Wireless Networks	4	-	-	4	-	-	4
ITDLO-II	Department Level Optional Course -II	4	-	-	4	-	-	4
ITL601	Software Design Lab	-	2	-	-	1	-	1
ITL602	Business Intelligence Lab	-	2	-	-	1	-	1
ITL603	Cloud Service Design Lab	-	2	-	-	1	-	1
ITL604	Sensor Network Lab	-	2	-	-	1	-	1
ITM605	Mini-project	-	4	-	-	2	-	2
	Total	**20**	**12**	-	**20**	**6**	-	**26**

Course Code	Course Name	Theory	Practical	Tutorial	Theory	Oral & Practical	Tutorial	Total
ITC601	Software Engineering with Project Management	04	--	--	04	--	--	04

Course Code	Course Name	Examination Scheme						
		Theory Marks				Term Work	Oral & Practical	Total
		Internal assessment			End Sem. Exam			
		Test1	Test2	Avg. of two Tests				
ITC601	Software Engineering with Project Management	20	20	20	80	--	--	100

Course Objectives: Students will try:

1. To understand the nature of software development and software life cycle process models, agile software development, SCRUM and other agile practices.
2. To Explain methods of capturing, specifying, visualizing and analyzing software requirements.
3. To understand concepts and principles of software design and user-centric approach and principles of effective user interfaces.
4. To know basics of testing and understanding concept of software quality assurance and software configuration management process.
5. To understand need of project management and project management life cycle.
6. To understand project scheduling concept and risk management associated to various type of projects.

Course Outcomes: Students will be able to:

1. Define various software application domains and remember different process model used in software development.
2. Explain needs for software specifications also they can classify different types of software requirements and their gathering techniques.
3. Convert the requirements model into the design model and demonstrate use of software and user-interface design principles.
4. Distinguish among SCM and SQA and can classify different testing strategies and tactics and compare them.
5. Justify role of SDLC in Software Project Development and they can evaluate importance of Software Engineering in PLC.
6. Generate project schedule and can construct, design and develop network diagram for different type of Projects. They can also organize different activities of project as per Risk impact factor.

Prerequisite: Programming and Networking.

Detailed syllabus:

Sr. No.	Module	Detailed Content	Hours	CO Mapping
0	Prerequisite	Nature of Software, Software Definition, Software Characteristics, Software Application Domains	02	
I	The Software Process	Generic view of Process, Prescriptive Models: Waterfall Model, Incremental-RAD Model, Evolutionary Process Model-Prototyping, Spiral and Concurrent Development Model, Specialized Models: Component based, Aspect Oriented Development, Agile Methodology, Scrum and Extreme Programming	07	CO1
II	Requirements Engineering and Cost Estimation	Requirement, Types of Requirements, Requirement gathering, Requirement Engineering Task, Identifying Stakeholders, Multiple viewpoints, SRS (Software Requirement Specification) Project Estimation, LOC based, FP based and Use case based estimation.	07	CO1 CO2
III	Analysis and Design Engineering	Introduction of Analysis elements, Scenario based, Flow based, behavior and class based Design Concepts and Principles, Architecture Design, Component Level Design, System Level Design, User Interface Design.	09	CO1 CO2 CO3
IV	Quality & Configuration Management	Need for Testing, Testing Tactics, Testing strategies, McCall's Quality Factor, Software Configuration Management, SCM Process	07	CO4
V	IT Project Management	Introduction, 4 P's, W5HH Principle, Need for Project Management, Project Life cycle and ITPM, Project Feasibility, RFP, PMBOK Knowledge areas, Business Case, Project Planning, Project Charter and Project Scope.	10	CO5

VI	Project Scheduling and Risk Management	WBS, Developing the Project Schedule, Network Diagrams (AON, AOA), CPM and PERT, Gantt Chart, Risk Identification, Risk Projection and RMMM	10	CO1 CO2 CO3 CO4 CO6

Text Books:

1. Roger S Pressman "Software Engineering : A Practitioner's Approach" 7th Edition Mcgraw-Hill ISBN:0073375977
2. Jack T. Marchewka, "Information Technology Project Management" 4th Edition ,Wiley India

References:

1. "Software Engineering : A Precise Approach" Pankaj Jalote , Wiley India
2. Ian Sommerville " Software Engineering" 9th edition Pearson Education SBN-13: 978-0- 13-703515-1, ISBN-10: 0-13-703515-2
3. John M. Nicholas, Project Management for Business and Technology, 3rd edition, Pearson Education.
4. Software Project management by Bob Hughes, Mike Cotterell , Rajib Mall

Assessment:

Internal Assessment for 20 marks:
Consisting of **Two Compulsory Class Tests**
Approximately 40% to 50% of syllabus content must be covered in First test and remaining 40% to 50% of syllabus contents must be covered in second test.

End Semester Examination: Some guidelines for setting the question papers are as:

- Weightage of each module in end semester examination is expected to be/will be proportional to number of respective lecture hours mentioned in the syllabus.
- Question paper will comprise of total **six questions**, **each carrying 20 marks.**
- **Q.1** will be **compulsory** and should **cover maximum contents of the syllabus**.
- **Remaining question will be mixed in nature** (for example if Q.2 has part (a) from module 3 then part (b) will be from any other module. (Randomly selected from all the modules.)
- Total **four questions** need to be solved.

Course Code	Course Name	Examination Scheme								
		Theory					TW	Oral	Oral & Pract	Total
		Internal Assessment			End Sem. Exam	Exam Duration (in Hrs)				
		Test 1	Test 2	Avg.						
ITC601	Software Engineering with Project Management	20	20	20	80	3	-	-	-	100
ITC602	Data Mining and Business Intelligence	20	20	20	80	3	-	-	-	100
ITC603	Cloud Computing & Services	20	20	20	80	3	-	-	-	100
ITC604	Wireless Networks	20	20	20	80	3	-	-	-	100
ITDLO-II	Department Level Optional Course -II	20	20	20	80	3	-	-	-	100
ITL601	Software Design Lab	-	-	-	-	-	25	25	--	50
ITL602	Business Intelligence Lab	-	-	-	-	-	25	25	--	50
ITL603	Cloud Service Design Lab	-	-	-	-	-	25	25	--	50
ITL604	Sensor Network Lab	-	-	-	-	-	25	25	--	50
ITM605	Mini-Project	-	-	-	-	-	25	25	--	50
Total		100	100	100	400	-	125	125	--	750

 # Department Level Optional Course (DLO)

Every student is required to take one Department Elective Course for Semester VI. Different sets of courses will run in both the semesters. Students can take these courses from the list of department electives, which are closely allied to their disciplines.

(DLO-I subjects will have no Labs only Theory)

Subject Code	Department Level Optional Course (DLO)
Semester VI	
ITDLO6021	Advance Internet Programming
ITDLO6022	Software Architecture
ITDLO6023	Digital Forensics
ITDLO6024	Multimedia Systems
ITDLO6025	Green IT

Course Code	Course Name	Theory	Practical	Tutorial	Theory	Practical/Oral	Tutorial	Total
ITDLO6023	Digital Forensics	04	--	-	04	--	-	04

Course Code	Course Name	Examination Scheme						
		Theory Marks				Term Work	Oral & Practical	Total
		Internal assessment			End Sem. Exam			
		Test1	Test2	Avg. of two Tests				
ITDLO6023	Digital Forensics	20	20	20	80	--	--	100

Course Objectives: Students will try:

1. To understand underlying principles and many of the techniques associated with the digital forensic practices and cyber crime
2. To explore practical knowledge about ethical hacking Methodology.
3. To learn the importance of evidence handling and storage for various devices
4. To develop an excellent understanding of current cyber security issues (Computer Security Incident) and analyzed the ways that exploits in securities.
5. To investigate attacks, IDS .technical exploits and router attacks and "Trap and Trace" computer networks.
6. To apply digital forensic knowledge to use computer forensic tools and investigation report writing.

Course Outcomes: Student will able to:

1. Define the concept of ethical hacking and its associated applications in Information Communication Technology (ICT) world.
2. Underline the need of digital forensic and role of digital evidences .
3. Explain the methodology of incident response and various security issues in ICT world, and identify digital forensic tools for data collection .
4. Recognize the importance of digital forensic duplication and various tools for analysis to achieve adequate perspectives of digital forensic investigation in various applications /devices like Windows/Unix system.
5. Apply the knowledge of IDS to secure network and performing router and network analysis
6. List the method to generate legal evidence and supporting investigation reports and will also be able to use various digital forensic tools .

Prerequisite: Cryptography and Security, Computer Networks

Detailed syllabus:

Sr. No.	Module	Detailed Content	Hours	CO Mapping
0	Prerequisite	Cryptography and Security ,Computer Networks	2	
I	Introduction to Cyber Crime and Ethical Hacking	**Introduction of Cybercrime**: Types of cybercrime ,categories of cybercrime , Computers' roles in crimes, Prevention from Cyber crime, Hackers, Crackers, Phreakers **Ethical Hacking** :Difference between Hacking and Ethical hacking : Steps of Ethical Hacking, Exploring some tools for ethical hacking: reconnaisance tools, scanning tools	6	CO1
II	Introduction to Digital Forensics and Digital Evidences	**Digital Forensic** ,Rules for Digital Forensic The Need for Digital Forensics, Types of Digital Forensics, Ethics in Digital Forensics, **Digital Evidences** : Types and characteristics and challenges for Evidence Handling	6	CO2
III	Computer Security Incident Response Methodology	**Introduction to Computer Security Incident** Goals of Incident response, Incident Response Methodology, Formulating Response Strategy, **IR Process** – Initial Response, Investigation, Remediation, Tracking of Significant ,Investigative Information, Reporting **Pre Incident Preparation,** Incident Detection and Characterization. **Live Data Collection** : Live Data Collection on Microsoft Windows Systems: Live Data	11	CO3

		Collection on Unix-Based Systems		
IV	Forensic Duplication and Disk Analysis, and Investigation	**Forensic Duplication** Forensic Image Formats, Traditional Duplication, Live System Duplication, Forensic Duplication tools **Disk and File System Analysis:** Media Analysis Concepts, File System Abstraction Model The Sleuth Kit : Installing the Sleuth Kit , Sleuth Kit Tools Partitioning and Disk Layouts : Partition Identification and Recovery, Redundant Array of Inexpensive Disks Special Containers : Virtual Machine Disk Images , Forensic Containers Hashing, Carving : Foremost , Forensic Imaging : Deleted Data , File Slack , dd , dcfldd , dc3dd **Data Analysis** Analysis Methodology Investigating Windows systems , Investigating UNIX systems , Investigating Applications, Web Browsers, Email, Malware Handling: Static and Dynamic Analysis	11	CO4
V	Network Forensics	Technical Exploits and Password Cracking , Introduction to Intrusion Detection systems, Types of IDS Understanding Network intrusion and attacks , Analyzing Network Traffic, Collecting Network based evidence, Evidence Handling. Investigating Routers, Handling Router Table Manipulation Incidents, Using Routers as Response Tools	9	CO5
VI	Forensic Investigation	**Report** :Goals of Report, Layout of an		

	Report and Forensic Tools	Investigative Report, Guidelines for Writing a Report, sample for writing a forensic report . **Computer Forensic Tools** : need and types of computer forensic tools, task performed by computer forensic tools . Study of open source Tools like SFIT, Autopsy etc. to acquire, search, analyze and store digital evidence	7	CO6

Text Books:

1. Jason Luttgens, Matthew Pepe, Kevin Mandia, "Incident Response and computer forensics",3rd Edition Tata McGraw Hill, 2014.
2. Nilakshi Jain, Dhananjay Kalbande, "Digital Forensic : The fascinating world of Digital Evidences " Wiley India Pvt Ltd 2017.
3. Cory Altheide, Harlan Carvey "Digital forensics with open source tools "Syngress Publishing, Inc. 2011.
4. Chris McNab, Network Security Assessment, By O'Reily.

References:

1. Clint P Garrison "Digital Forensics for Network, Internet, and Cloud Computing A forensic evidence guide for moving targets and data , Syngress Publishing, Inc. 2010
2. Bill Nelson,Amelia Phillips,Christopher Steuart, "Guide to Computer Forensics and Investigations" . Cengage Learning, 2014
3. Debra Littlejohn Shinder Michael Cross "Scene of the Cybercrime: Computer Forensics Handbook", 2nd Edition Syngress Publishing, Inc.2008.
4. Marjie T. Britz, Computer Forensics and Cyber Crime, Pearson, Third Edition.

Assessment:

Internal Assessment for 20 marks:
Consisting of **Two Compulsory Class Tests**
Approximately 40% to 50% of syllabus content must be covered in First test and remaining 40% to 50% of syllabus contents must be covered in second test.

End Semester Examination: Some guidelines for setting the question papers are as:

- Weightage of each module in end semester examination is expected to be/will be proportional to number of respective lecture hours mentioned in the syllabus.
- Question paper will comprise of total **six questions**, **each carrying 20 marks.**
- **Q.1** will be **compulsory** and should **cover maximum contents of the syllabus**.
- **Remaining question will be mixed in nature** (for example if Q.2 has part (a) from module 3 then part (b) will be from any other module. (Randomly selected from all the modules.)
- Total **four questions** need to be solved.

The ideal intern is committed, creative, organized, ambitious, independent, and able to crack a smile, whether meeting a celebrity or folding socks. - Emily Weiss

TEDxCRCE Report
2018-19

On the 9th of March 2019, TEDxCRCE organised the "Internship & Career Expo" hosting multiple companies at our college campus. The expo was attended by over 500 students from various colleges. We set a platform where students from all branches got an opportunity to intern at companies most suited for them. We were successful in bringing together companies from different domainsThis year we had 15 companies from various domains with a majority of them offering technical profiles.The companies that attended the expo this year were:

1. Teach For India 2.
TDKR 3. SPEED
BOX 4. Cloud
Counselage 5.
Deplonity Infotech 6.
IDA 7. Dr Vaidya's 8.
Adagio 9. Mica labs
10. Kaveri
Enterprises 11.
Wander Stamps 12.
Roti Bank 13. Logical
Swing 14. Gemsons
15. AtriTechnocrat

Many of these companies are leaning towards becoming recruiters for our college.We observed a fabulous response from companies

and an equally resounding feedback from the students this year.We believe The Internship & Career Expo 2019 was one of CRCE's

flagship events.At the end of the event proper feedback was taken from every company with every point beimg noted so as to have an

even better event
next year.

We would like to express our sincere gratitude to our Director Fr. Valerian D'souza, Principal Dr. Srija Unnikrishnan, the college

management, our Teacher-in-charges- Prof Prachi Patil, Prof Ketaki Joshi, our faculty members

and the student community for their unstinted, consistent support and encouragement in all our endeavours. I would also extend my gratitude to my senior council who have

continued to make TEDxCRCE strive for more every year. It is team work that makes an event a success and the working heads of the

present TEDxCRCE council are walking on the path to make this entity a success. Going forward, we at TEDxCRCE will endeavour to

achieve a fresh new outlook for our projects and will raise the bar further in creating more powerful, professional and energetic

community centric
events.

Renjit Koshy Internship Expo
Head, TEDxCRCE

Faculty Incharge
Raehi Patil

TEDx CRCE

x = independently organized TED event

RESUME BUILDING WORKSHOP

06 MARCH 2019
WEDNESDAY

SAMVAAD
AUDITORIUM

CONTACT:
RENJIT - 9833435229
JAISON - 9833404791

1. Overview and Details:

Type of Program	**Mock Interviews for Final year students**
Date	**22 September 2018**
Name of experts	**Bhargav Zantye, Darren Sequiera, Shraddha Makwana, Devika Sindhwani, Parikshit Rai, our IT alumni,** **Blessy Antony, Durgesh Ramani , Aditya Desai, Ruben Monterio, our CS Alumni,** **Rubina Parveen, Yash Singh, Peter Breganza and Racheal our Elex alumni**
Expert's Profile1 **Expert's Profile2**	**-**
Participants details	**70 Students from department of IT, CS and ELex**
Relevance to academic subjects	**Application of Academic knowledge in interview**
Relevance to Program Outcomes	**P08,PO9,PO10,PO11,PO12**
Relevance to Program Specific Outcomes	**Department specific**
Conclusion	**Students gained help to crack interview from the experts appointed for the betterment of students.**

About the Program:

Department of Computer Engineering, Information Technology and Electronic Engineering along with Training and Placement Cell had come up with a short mid-term initiative to train the students of Final Year to groom their personal and technical traits for upcoming bulk placement drive. As a part of this program, Mock Technical and HR Interview sessions were conducted on 22nd September 2018. The program was dedicated to students finding difficulty to crack the interviews and to point out the shortcomings to boost the students into right directions.

Alumni from all the departments were selected by their respective departments to help students in this course. **Bhargav Zantye, Darren Sequiera, Shraddha Makwana, Devika Sindhwani, Parikshit Rai, our IT alumni, Blessy Antony, Durgesh Ramani , Aditya Desai, Ruben Monterio, our CS Alumni, Rubina Parveen, Yash Singh, Peter Breganza and Racheal our Elex alumni were present on the day.**

The interviews were taken by two experts per student one from technical aspect and other from non-technical(HR) aspect. The students were provided various piece of advices and the feedback was maintained by the Alumni to later guide the students. Students were also helped by the alumni to master the grooming skills and dressing skills for the interview.

Incharge Signature

SOCIETY OF ST. FRANCIS XAVIER, PILAR'S

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Fr. Agnel Ashram, Bandstand, Bandra (W), Mumbai - 400 050.

Phone : (022) 6711 4000, 6711 4101, 6711 4104 • Fax : 6711 4100

Website : www.frcrce.ac.in • Email : crce@fragnel.edu.in

Ref.: CRCE / 2018

Date : September 21, 2018.

To
Mr. Durgesh Ramani
Bank of America
Mumbai, India.

Sub: Invitation to conduct mock interviews at our campus

Dear Sir,

At the outset, please accept our greetings.

Fr. Conceicao Rodrigues College of Engineering is conducting mock interview training for the final year students on 22nd September 2018 at our campus. The training will provide our students with an opportunity to test out and improve their interview skills and boost their confidence.

We invite you as an interviewer for the training. As an interviewer, you will be responsible for taking interviews of the students and giving them on the spot feedback.

We humbly request you to accept our invitation.

Thanking you,

Yours faithfully,

(DR. SRIJA UNNIKRISHNAN)
PRINCIPAL

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Mumbai, India.

Sub: Thanksgiving for conducting mock interviews at our campus

Dear Sir,

At the outset we extend our appreciation for conducting mock interview training for the final year students on 22nd September 2018 at our campus.

The training has provided our students an opportunity to improve upon their interview skills and boost their confidence.

We thank you for sparing your valuable time and efforts in conducting the interviews

Looking forward for similar co-operation in future.

Thanking you,

Yours faithfully,

(DR. SRIJA UNNIKRISHNAN)
PRINCIPAL

Received
DSR
22/09/2018

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Ref.: CRCE / 2018 *Date* : September 21, 2018.

To
Ms. Blessy Antony
J. P. Morgan
Mumbai, India.

Sub: Invitation to conduct mock interviews at our campus

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Ref: CRCE / 2018 *Date* : September 21, 2018.

To
Mr. Tanay Vaidya
Reliance Jio Infocom Ltd.
Mumbai, India.

Sub: Invitation to conduct mock interviews at our campus

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Fr. Agnel Ashram, Bandstand, Bandra (W), Mumbai – 400 050.

Ref.: CRCE / 2019 / 167

Date : April 9, 2019.

NOTICE

All T. E. Students

Aptitude test training for placement purpose will be arranged for 7 days starting from 24th June 2019 and ending on 30th June. The cost of the training is Rs.2,500/- including GST.

Students who have missed out to register for the training may do so by paying Rs.2,500/- in the College Office on or before 30th April 2019.

PRINCIPAL

C.C. : Fr. Valerian D'Souza

HOD- Prod / Elex / Comp / Info. Tech.

Third Year Class teachers – Please read this notice in Classroom

- Production – Ms. Dipali Bhise
- Electronics – Ms. Kranti Wagle
- Computer – Mr. Sunil Chaudhari
- Info. Tech. – Mr. Nilesh Patil

Mr. Mahesh Sharma, Training & Placement Officer – For co-ordination.

Training & Placement Coordinators

- Production – Mr. Saurabh Korgaonkar / Mr. Prasad Kawade
- Electronics – Ms. Heenakausar Pendhari / Mr. Jayen Modi
- Computer – Mr. Sunil Chaudhari / Ms. Monali Shetty
- Info. Tech. – Mr. Jay Borade / Mr. Saurabh Kulkarni

Accenture Specific Training 1.10.18

II

Roll No	Name	Sign
7687	Rainzil Dabre	
7737	Suzanne Tuscano	
8115	Navil Rodrigues	
7558	Trish Bandhekar	
7696	Alisha ~~Rodrigues~~ Gonsalves	
7710	Rohan Naik	
7724	Rahish Rayan	
7707	Gladson Nadar	
7706	Vishal Mishra	
7702	Amit Kawad	
7725	Russel Rodricks	
8111	Blewett Dmonte	
7692	Damian Fargose	
~~7692~~		
7685	Stafford Crasto	
7709	Omkar Naik	
8110	Kevin D'mello	
8112	Wan Jun	
7723	Ujjwal Raut	
7711	Aasawari Namjoshi	
7685	Joel Coutinho	
7681	shirani bhatti	
7602	Devshree Shinde	
7715	Manasi Parmar	
7708	Jeshika Nadar	

Accenture specific Training

Electronics

1.10.18

	Roll No	Name	Sign
1	8089	Tanvi Ranim	
2	8087	Gauri Pawar	
3	8075	Aqib Kazi	
4	8064	Sarfaraz Ansari	
5	8069	Siddeshwar. S.	
6	8092	Manasvi Vartak	
7	7588	Evanjalin Benita	
8	7593	Mikhail Pinto	
9	8074	Vinayak Kamat	
10	7573	Anarith Embrardiri	
11	7553	Ashutosh Anand	
12	8081	Rohit Marathe	
13	7567	Parth Dave	
14	8071	Mark FERNANDES	
15	7586	Jacob Mathew	
16	7560	Amrit keshri	
17	7585	Shaibil Mangadiyan	
18	7590	Anand Namboothiri	
19	7606	NIKHIL UPADHYAY	

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Ref.: CRCE / 2018 *Date* : July 5, 2018.

To
Mr. Varun Chetan Bhatt
Technology Consultant
Teach for India (TFI)

***Sub.*:- Request for interaction with students preparing for TCS Digital placements**

Dear Sir,

We would like to extend you an invitation to visit our Institute as a Resource person for interacting with our prospective students interested in preparing for on-campus placements in TCS Digital.

We sincerely believe that your experience in TCS Digital will be instrumental in providing our students with the correct inputs required to appear for TCS Digital on-campus placements. Our students would also be looking forward to your expertise and guidance in the placement process.

We have scheduled your expert session interaction on 7th July 2018 at 11 am onwards.

We look forward to your esteemed presence at our campus and also thank you in anticipation for taking out time from your busy schedule in mentoring our students.

Kindly sign the duplicate of this invitation letter as an acknowledgement.

Yours truly,

(DR. SRIJA UNNIKRISHNAN)
PRINCIPAL

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Ref.: CRCE / 2018 *Date* : July 5, 2018.

To
Ms. Priyanka Vilas Bane
Systems Engineer
TCS Digital

Sub.:- **Request for interaction with students preparing for TCS Digital placements**

Dear Madam,

We would like to extend you an invitation to visit our Institute as a Resource person for interacting with our prospective students interested in preparing for on-campus placements in TCS Digital.

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Ref.: CRCE / 2018

Date : July 5, 2018.

To
Mr. Jacob Abel Verghese
Systems Engineer
TCS Digital

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