REVA UNIVERSITY

School of Computing and Information Technology

Date: 08-04-2017

Proceedings of the Meeting of the Board of Studies in School of Computing and Information Technology held on 08/04/2017

Members Present:

Sl.No.	Name of the Faculty	Position	Signature
1	Dr. Sunilkumar S. Manvi Director, School of C & IT	Chairman	
2	Dr. Sathish Babu Professor and Head, SIT, Tumkur bsb@sit.ac.in,bsbsit@gmail.com 9844488329	Member	
3	Mr. Shivakumar Chetan, General Manager, CISCO, Bengaluru Shivakumar.chetan@gmail.com 09844092785	Member	
4	Muralidhar Jahagirdar, Practice Head, ATMECS Technologies 9591330009 murali.sj@atmecs.com	Member	
5	Mr. Pradeep G. Vice President pradeep@fice.in 9980136933	Member	ABSENT
6	Mr. Ambadas T. IBM, Bengaluru 7483006565 Ambadas.t.t@in.ibm.com	Member	
7	Dr. Mallikarjuna Shastry P.M. Professor, School of C & IT	Member	
8	Dr. Kirankumari Patil Professor, School of C & IT	Member	
9	Prof. Ashwinkumar U. M. Associate Professor,	Member	
10	Dr. Mallikarjuna Kodabagi Professor, School of C & IT	Member	
11	Dr. Vishwanath Professor, School of C & IT	Member	

The following members expressed their inability to attend the meeting due to their other commitments.

1. Mr. Ananth kolhar,
Vice President,
Mphasis, Bengaluru-560 078
9880932485
akolhar@yahoo.com

2. Mr. Kottur, Vice-President,
Wipro Technologies,
9845598730
prabhunandayya.kotur@wipro.com

3. Dr. Punitha
Data Scientist, IBM, Bengaluru
9980989800
punithaswamy@gmail.com

4.Mr. Pradeep G.
Vice President
pradeep@fice.in
9980136933

Co-Opted Members:

Name of the Person	Position	Signature
Prof. Sathish G. C.	Member	
Prof. Venkatesh Prasad	Member	
Dr. Shilpa Choudhary	Member	

Agenda-1: M. Tech in Computer Science and Engineering-Full Time, MTech in Data Engineering and Cloud Computing- Full Time with New Schemes.

Proposal: Approval of new Scheme and Syllabus of M. Tech in Computer Science and Engineering - Full Time, M. Tech in Data Engineering and Cloud Computing- Full Time for 2017-19.

Ref: Annexure dated 28/01/2017.

Resolution: Members of Board of Studies went through the Scheme and Syllabus of
i) M. Tech in Computer Science and Engineering –Full time and
ii) M. Tech in Data Engineering and Cloud Computing full time for 2017-2019.

The members of the Committee had a detailed discussion and finally ratified the Scheme and syllabus of both the programmes.

NOTE: New Schemes of above programs are appended Appendix.

M.Tech CSE-FT

MTCS17F1100	Advanced Database Management Systems - 95%
MTCS17F1300	Machine Learning and Deep Learning - 90%
MTCS17F1420	Advanced Storage Area Networks - new
MTCS17F1430	Statistical Data Modeling and Analysis - new
MTCS17F1510	Image Processing - 25%
MTCS17F1520	Mobile Application development - 100%
MTCS17F1530	Agile Software Development- 100%
MTCS17F1610	Python Programming - 25%
MTCS17F1620	Robotics-new
MTCS17F2100	Principles of Algorithm Design (DAA) - 100%
MTCS17F2200	Big Data and Analytics Using R -100%
MTCS17F2300	Internet of Things - 99%
MTCS17F2410	Computer Network Engineering - 95%
MTCS17F2420	Research Methodology - new
MTCS17F2430	Open Source Cloud Computing Tools - new
MTCS17F2510	Unix Operating System & Internals - new
MTCS17F2520	Cyber Security -new
MTCS17F2530	Advanced Java Programming - new
MTCS17F2610	Parallel Computing and Programming - new
MTCS17F2620	Human Computer Interaction (UI/UX Design) - new
MTCS17F2630	Embedded Computing Systems - new
MTCS17F3110	Text and Web Mining- new
MTCS17F3120	Soft Computing- new
MTCS17F3130	Wireless Networks- new

M.Tech DECC

MTDE17F1100	Machine Learning and Deep Learning - 100%
MTDE17F1200	Cloud Computing - new
MTDE17F1300	Data Mining Techniques - new
MTDE17F1410	Statistical Data Modelling and Analysis - new
MTDE17F1430	Robotics- new
MTDE17F1510	Python Programming - 30%
MTDE17F1520	Mobile Cloud Computing- new
MTDE17F1530	Mobile Application Development- new
MTDE17F1610	Cloud Data Management- new
MTDE17F1620	Advanced Storage Area Networks-25%
MTDE17F1630	Agile Software Development- new
MTDE17F2100	Predictive Analytics using R- new
MTDE17F2200	Big Data and Hadoop- new
MTDE17F2410	Internet of Things- new
MTDE17F2420	Research Methodology- new
MTDE17F2430	Data Analytics using Rapid Miner- new
MTDE17F2510	Cyber Security- new
MTDE17F2520	Cloud Architectures - 85%
MTDE17F2530	Open Source cloud Computing tools- new
MTDE17F2610	Healthcare Analytics- new

MTDE17F2620	Human Computer Interaction (UI/UX Design)- new
MTDE17F2630	Advanced Java Programming- new
MTDE17F3110	Soft Computing- new
MTDE17F3120	Wireless Networks- new
MTDE17F3130	HR Analytics- new
MTDE17F3200	Health Care Analytics - new

Agenda -2: Scheme and Syllabus of B. Tech in Computer Science and Engineering from first year to final year for the batch 2017-21.

Proposal: Approval of continuation of Scheme and Syllabus of B. Tech in Computer Science and Engineering from first year to final year which was approved in BOS/CIT/BCS/2014-15/3/14-03-2015 for the batch 2017-21.
With changes in the following subjects of first year,2017-21 batch :

- **i)** Replacement of Basic Electrical Engineering lab and Workshop Practice(BTEW16F1900) of first year with Basic Electrical Engineering lab (BTEE16F1900).
- **ii)** Replacement of Communicative English (BTCE15F1700) with Technical English I (BTCE17F1700) of first year.
- **iii)** Replacement of Technical Communication and documentation (BTTC15F2600) with Technical English II (BTTC17F2600) of first year.

Resolution: The members of BoS went through the Scheme and Syllabus of B. Tech in Computer Science and Engineering from first year to final year, which was approved in BOS/CIT/BCS/2014-15/3/14-03-2015 for the batch 2017-21 and approved the continuation of the same for 2017-21 along with the changes in the above mentioned subjects. The Committee also approved the revision of the syllabus in certain previously existing courses and introduction of the new courses.(The List of new and revised courses are attached).

Agenda-3: Open Elective for 7th semester, BTech for 2017-18.
Proposal: Approval of Open Elective for 7th semester, BTech for 2017-18.

Open Electives for UG:

a. Data Structures Using C
b. Internet Computing and Applications

Open Electives for PG:
Introduction to Cloud Computing and Data Science

Resolution: Members of Board of Studies went through the syllabus of all the above open electives and decided to offer ", "**Data Structures using C"** and **"Internet Computing & Applications**" for BTech programme and "**Introduction to Cloud Computing and Data Science**" for MTech as the open elective for 2017-18. The Committee also approved the revision of the syllabus in certain previously existing courses and introduction of the new courses.(The List of new and revised courses are attached).

Agenda-4 M.Tech in Computer Science & Engineering- Part Time with Schemes approved in BOS/CIT/PCN/2015-16/4/02-04-2016 and BOS/CIT/PCS/2015-16/4/02-04-2016 for 2017-18

Proposal: Continuation of Scheme and Syllabus M.Tech in Computer Science & Engineering- Part Time with Schemes and syllabus approved in BOS/CIT/PCN/2015-16/4/02-04-2016 and BOS/CIT/PCS/2015-16/4/02-04-2016 for 2017-18 also.

Resolution: Members of Board of Studies went through the M. Tech in Computer Science & Engineering-Part Time for 2017-2018.

The members of the Committee had a detailed discussion and finally ratified the Scheme and syllabus of both the programmes. The Committee also approved the revision of the syllabus in certain previously existing courses and introduction of the new courses.(The List of new and revised courses are attached).

M.Tech CSE-PT

MTCS17P1100	Advanced Database Management Systems
MTCS17P1300	Machine Learning and Deep Learning
MTCS17P2100	Principles of Algorithm Design (DAA)
MTCS17P2200	Big Data and Analytics Using R
MTCS17P2300	Internet of Things
MTCS17P3120	Advanced Storage Area Networks
MTCS17P3130	Statistical Data Modeling and Analysis
MTCS17P3210	Image Processing
MTCS17P3220	Mobile Application development
MTCS17P3230	Agile Software Development
MTCS17P3310	Python Programming
MTCS17P3320	Robotics
MTCS17P4110	Computer Network Engineering
MTCS17P4120	Research Methodology
MTCS17P4130	Open Source Cloud Computing Tools
MTCS17P4210	Unix Operating System & Internals
MTCS17P4220	Cyber Security
MTCS17P4230	Advanced Java Programming
MTCS17P4310	Parallel Computing and Programming
MTCS17P4320	Human Computer Interaction (UI/UX Design)
MTCS17P4330	Embedded Computing Systems
MTCS17P5110	Text and Web Mining
MTCS17P5120	Soft Computing
MTCS17P5130	Wireless Networks

NOTE: The syllabi of some subjects are revised on the basis of feedback taken from stakeholders.

REVA UNIVERSITY
Bengaluru, India

Appendix – III

List of revised courses and new courses

Program: B.Tech in Computer Science and Engineering (B.Tech CSE)

Batch: 2017-2021

Course Code	Course Name	Remarks
BTCE17F1700	Technical English-1	New Course
BTEW15F1900	Basic Electrical Engineering Lab	New Course
BTTCF2600	Technical English-2	New Course
BTCS15F7420	VLSI Design and Algorithms	New Course

No of New Courses & Courses Revision (>20%)	4
No of New Courses Revision (>20%)	-

REVA UNIVERSITY SCHOOL OF CSE

Ref: RU/BOS/CSE/April-2017-8

Program: M. Tech in Computer Science and Engineering (M.Tech Full CSE)

Batch: 2017-2019

Course Code	Courses	Revision %
	2017 Batch(1/2 sem)	
MTCS17F1100	Advanced Database Management Systems	95%
MTCS17F1300	Machine Learning and Deep Learning	90%
MTCS17F1420	Advanced Storage Area Networks	New Course
MTCS17F1430	Statistical Data Modelling and Analysis	New Course
MTCS17F1510	Image Processing	25%
MTCS17F1520	Mobile Application development	100%
MTCS17F1530	Agile Software Development	100%
MTCS17F1610	Python Programming	25%
MTCS17F1620	Robotics	New Course
MTCS17F2100	Principles of Algorithm Design (DAA)	100%
MTCS17F2200	Big Data and Analytics Using R	100%
MTCS17F2300	Internet of Things	99%
MTCS17F2410	Computer Network Engineering	95%
MTCS17F2420	Research Methodology	New Course
MTCS17F2430	Open Source Cloud Computing Tools	New Course
MTCS17F2510	Unix Operating System & Internals	New Course
MTCS17F2520	Cyber Security	New Course
MTCS17F2530	Advanced Java Programming	New Course
MTCS17F2610	Parallel Computing and Programming	New Course
MTCS17F2620	Human Computer Interaction (UI/UX Design)	New Course
MTCS17F2630	Embedded Computing Systems	New Course
	2017 Batch(3/4 sem)	
MTCS17F3110	Text and Web Mining	New Course
MTCS17F3120	Soft Computing	New Course
MTCS17F3130	Wireless Networks	New Course

No of New course Courses & Courses Revision (>20%)	24
No of Courses Revision (<20%)	-

Ref: RU/BOS/MTech/FT/CSE/April-2017-8

Program: M. Tech in Computer Science and Engineering (M.Tech Part-Time CSE)

Batch: 2017-2020

Course Code	Courses	Revision %
	2017 Batch(1/2 sem)	
MTCS17P1100	Advanced Database Management Systems	95%
MTCS17P1300	Machine Learning and Deep Learning	90%
MTCS17P2100	Principles of Algorithm Design (DAA)	New Course
MTCS17P2200	Big Data and Analytics Using R	New Course
MTCS17P2300	Internet of Things	25%
	2017 Batch(3/4 sem)	
MTCS17P3120	Advanced Storage Area Networks	100%
MTCS17P3130	Statistical Data Modeling and Analysis	100%
MTCS17P3210	Image Processing	25%
MTCS17P3220	Mobile Application development	New Course
MTCS17P3230	Agile Software Development	100%
MTCS17P3310	Python Programming	100%
MTCS17P3320	Robotics	99%
MTCS17P4110	Computer Network Engineering	95%
MTCS17P4120	Research Methodology	New Course
MTCS17P4130	Open Source Cloud Computing Tools	New Course
MTCS17P4210	Unix Operating System & Internals	New Course
MTCS17P4220	Cyber Security	New Course
MTCS17P4230	Advanced Java Programming	New Course
MTCS17P4310	Parallel Computing and Programming	New Course
MTCS17P4320	Human Computer Interaction (UI/UX Design)	New Course
MTCS17P4330	Embedded Computing Systems	New Course
	2017 Batch(5/6 sem)	
MTCS17P5110	Text and Web Mining	New Course
MTCS17P5120	Soft Computing	New Course
MTCS17P5130	Wireless Networks	New Course

No of New course Courses & Courses Revision (>20%)	24
No of Courses Revision (<20%)	-

Ref: RU/BOS/MTech/PT/CSE/April-2017-8

Date:

BoS Chairman

REVA UNIVERSITY SCHOOL OF CSE

REVA UNIVERSITY

Bengaluru, India

SCHOOL OF COMPUTING AND INFORMATION TECHNOLOGY

B. TECH – COMPUTER SCIENCE & ENGINEERING

2017-2021

Rukmini Educational Charitable Trust

REVA UNIVERSITY
Bengaluru, India

SCHOOL OF COMPUTING AND INFORMATION TECHNOLOGY

HANDBOOK

B. Tech. in Computer Science & Engineering

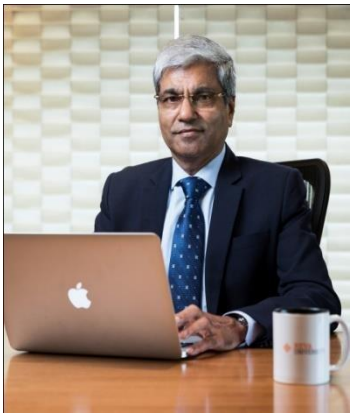
2017-21

Rukmini Knowledge Park,
Kattigenahalli, Yelahanka, Bangalore - 560 064
Phone No: +91-080-66226622, Fax: 080-28478539

Rukmini Educational
Charitable Trust

www.reva.edu.in

Chancellor's Message



"Education is the most powerful weapon which you can use to change the world."

- Nelson Mandela. There was a time when survival depended on just the realization of physiological needs. We are indeed privileged to exist in a time when 'intellectual gratification' has become indispensable. Information is easily attainable for the soul that is curious enough to go look for it. Technological boons enable information availability anywhere anytime. The difference, however, lies between those who look for information and those who look for knowledge.

It is deemed virtuous to serve seekers of knowledge. As educators, it is in the ethos at REVA University to empower every learner who chooses to enter our portals. Driven by our founding philosophy of 'Knowledge is Power', we believe in building a community of perpetual learners by enabling them to look beyond their abilities and achieve what they assumed impossible.

India has always been beheld as a brewing pot of unbelievable talent, acute intellect and immense potential. All it takes to turn those qualities into power is a spark of opportunity. Being at a University is an exciting and rewarding experience with opportunities to nurture abilities, challenge cognizance and gain competence.

For any University, the structure of excellence lies in the transitional abilities of its faculty and its facility. I'm always in awe of the efforts that our academic board puts in to develop the team of subject matter experts at REVA. My faculty colleagues understand our core vision of empowering our future generation to be ethically, morally and intellectually elite. They practice the art of teaching with a student-centered and transformational approach. The excellent infrastructure at the University, both educational and extra-curricular, magnificently demonstrates the importance of ambience in facilitating focused learning for our students.

A famous British politician and author from the 19th century - Benjamin Disraeli, once said 'A University should be a place of light, of liberty and of learning'. Centuries later this dictum still inspires me and I believe, it takes team-work to build successful institutions. I welcome you to REVA University to join hands in laying the foundation of your future with values, wisdom and knowledge

Dr. P. Shyama Raju

The Founder and Hon'ble Chancellor, REVA University

Vice-Chancellor's Message

The last two decades have seen a remarkable growth in higher education in India and The move towards inter-disciplinary studies and interactive learning have opened up several options as well as created multiple challenges. India is at a juncture where a huge population of young crowd is opting for higher education. With the tremendous growth of privatization of education in India, the major focus is on creating a platform for quality in knowledge enhancement and bridging the gap between academia and industry across the globe.

A strong believer and practitioner of the dictum "Knowledge is Power", REVA University has been on the path of delivering quality education by developing the young human resources on the foundation of ethical and moral values, while boosting their leadership qualities, research culture and innovative skills. Built on a sprawling 45 acres of green campus, this 'temple of learning' has excellent and state-of-the-art infrastructure facilities conducive to higher teaching-learning environment and research. The main objective of the University is to provide higher education of global standards and hence, all the programs are designed to meet international standards. Highly experienced and qualified faculty members, continuously engaged in the maintenance and enhancement of student-centric learning environment through innovative pedagogy, form the backbone of the University.

All the programs offered by REVA University follow the Choice Based Credit System (CBCS) with Outcome Based Approach. The flexibility in the curriculum has been designed with industry-specific goals in mind and the educator enjoys complete freedom to appropriate the syllabus by incorporating the latest knowledge and stimulating the creative minds of the students. Bench marked with the course of studies of various institutions of repute, our curriculum is extremely contemporary and is a culmination of efforts of great think-tanks - a large number of faculty members, experts from industries and research level organizations. The evaluation mechanism employs continuous assessment with grade point averages. We believe sincerely that it will meet the aspirations of all stakeholders – students, parents and the employers of the graduates and postgraduates of REVA University.

At REVA University, research, consultancy and innovation are regarded as our pillars of success.

Most of the faculty members of the University are involved in research by attracting funded projects from various research level organizations like DST, VGST, DBT, DRDO, AICTE and industries. The outcome of the research is passed on to students through live projects from industries. The entrepreneurial zeal of the students is encouraged and nurtured through EDPs and EACs.

REVA University has entered into collaboration with many prominent industries to bridge the gap between industry and University. Regular visits to industries and mandatory internship with industries have helped our students. REVA University has entered into collaboration with many prominent industries to bridge the gap between industry and University. Regular visits to industries and mandatory internship with industries have helped our students become skilled with relevant to industry requirements. Structured training programs on soft-skills and preparatory training for competitive exams are offered here to make students more employable. 100% placement of eligible students speaks the effectiveness of these programs. The entrepreneurship development activities and establishment of "Technology Incubation Centers" in the University extend full support to the budding entrepreneurs to nurture their ideas and establish an enterprise.

With firm faith in the saying, "Intelligence plus character –that is the goal of education" (Martin Luther King, Jr.), I strongly believe REVA University is marching ahead in the right direction, providing a holistic education to the future generation and playing a positive role in nation building. We reiterate our endeavor to provide premium quality education accessible to all and an environment for the growth of over-all personality development leading to generating "GLOBAL PROFESSIONALS".

Welcome to the portals of REVA University!

Dr. S Y Kulkarni
Vice-Chancellor, REVA University

Director's – Message

I Congratulate and welcome all the students to the esteemed school of Computing and Information technology (C & IT)). You are in the right campus to become a computer technocrat. The rising needs of automation in Industry 4.0 and improvising living standards have enabled rapid development of computer software and hardware technologies. Thus, providing scope and opportunity to generate more human resources in the areas of computers and IT. The B.Tech, M.Tech and Ph.D programs offered in the school are designed to cater the requirements of industry and society. The curriculum is designed meticulously in association with persons from industries (TCS, CISCO, AMD, MPHASIS,
etc.), academia and research organizations (IISc, IIIT, Florida University, Missouri S & T University, etc).

This handbook presents the B.Tech in Computer Science and Engineering program curriculum. The program is of 4 years duration and split into 8 semesters. The courses are classified into foundation core, hard core, and soft core courses. Hard core courses represent fundamentals study requirements of CSE. Soft courses provide flexibility to students to choose the options among several courses as per the specialization, such as, AI, Data Science, and Systems. Theoretical foundations of engineering, science, and computer science are taught in first two and half years. Later, advanced courses and recent technologies are introduced in subsequent semesters for pursuing specialization.

The important features of the BTech CSE are as follows: 1) Choice based course selection and teacher selection, 2) Studies in emerging areas like Machine Learning, Artificial Intelligence, Data Analytics, Cloud Computing, Python/R Programming, NLP, IoT and Cloud security, 3) Short and long duration Internships 4) Opportunity to pursue MOOC course as per the interest in foundation and soft core courses, 5) Attain global and skill certification as per the area of specialization, 6) Self-learning components, 7) Experiential, practice, practical, hackathons, and project based learning, 8) Mini projects and major projects with research orientation and publication, 9) Soft skills training and 10) Platform for exhibiting skills in cultural, sports and technical activities through clubs and societies.

The school has well qualified faculty members in the various areas of computing and IT including cloud computing, security, IOT, AI, ML and DL, software engineering, computer networks, cognitive computing, etc. State of art laboratories are available for the purpose of academics and research. The curriculum caters to and has relevance to local, regional, national, global, development needs. Maximum number of courses are integrated with cross cutting issues with relevant to professional ethics, gender, human values, environment and sustainability.

Prof. Dr. Sunilkumar S. Manvi,
Director, School of Computing and IT

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RUKMINI EDUCATIONAL CHARITABLE TRUST

It was the dream of late Smt. Rukmini Shyama Raju to impart education to millions of underprivileged children as she knew the importance of education in the contemporary society. The dream of Smt. Rukmini Shyama Raju came true with the establishment of Rukmini Educational Charitable Trust (RECT), in the year 2002. Rukmini Educational Charitable Trust(RECT) is a Public Charitable Trust, set up in 2002 with the objective of promoting, establishing and conducting academic activities in the fields of Arts, Architecture, Commerce, Education, Engineering, Environmental Science, Legal Studies, Management and Science & Technology, among others. In furtherance of these objectives, the Trust has set up the REVA Group of Educational Institutions comprising of REVA Institute of Technology & Management (RITM), REVA Institute of Science and Management (RISM), REVA Institute of Management Studies (RIMS), REVA Institute of Education (RIE), REVA First Grade College (RFGC), REVA Independent PU College at Kattigenahalli, Ganganagar and Sanjay Nagar and now REVA University. Through these institutions, the Trust seeks to fulfill its vision of providing world class education and create abundant opportunities for the youth of this nation to excel in the areas of Arts, Architecture, Commerce, Education, Engineering, Environmental Science, Legal Studies, Management and Science & Technology.

Every great human enterprise is powered by the vision of one or more extraordinary individuals and is sustained by the people who derive their motivation from the founders. The Chairman of the Trust is Dr. P. Shyama Raju, a developer and builder of repute, a captain of the industry in his own right and the Chairman and Managing Director of the DivyaSree Group of companies. The idea of creating these top notched educational institutions was born of the philanthropic instincts of Dr. P. Shyama Raju to do public good, quite in keeping with his support to other socially relevant charities such as maintaining the Richmond Road Park, building and donating a police station, gifting assets to organizations providing accident and trauma care, to name a few.

The Rukmini Educational Charitable Trust drives with the main aim to help students who are in pursuit of quality education for life. REVA is today a family of ten institutions providing education from PU to Post Graduation and Research leading to PhD degrees. REVA has well qualified experienced teaching faculty of whom majority are doctorates. The faculty is supported by committed administrative and technical staff. Over 15,000+ students study various courses across REVA's three campuses equipped with exemplary state-of-the-art infrastructure and conducive environment for the knowledge driven community.

ABOUT REVA UNIVERSITY

REVA University has been established under the REVA University Act, 2012 of Government of Karnataka and notified in Karnataka State Gazette dated 7th February, 2013. The University is recognized by UGC under Sec 2 (f) and empowered under Sec.22 of the UGC Act, 1956 to award degrees in any branch of knowledge. The Programs of the University are approved by All India Council for Technical Education (AICTE), University Grants Commission (UGC), Bar Council of India (BCI), and Council of Architecture (COA). The University is a Member of Association of Indian Universities, New Delhi. The main objective of the University is to prepare students with knowledge, wisdom and patriotism to face the global challenges and become the top leaders of the country and the globe in different fields.

REVA University located in between KempeGowda International Airport and Bangalore city, has a sprawling green campus spread over 45 acres of land and equipped with state-of-the-art infrastructure that provide conducive environment for higher learning and research. The REVA campus has well equipped laboratories, auditoriums, seminar halls, custom-built teaching facilities, fully air-conditioned library and central computer centre, well-planned sports facility with cricket ground, running track & variety of indoor and outdoor sports activities, facilities for cultural programs. The unique feature of REVA campus is the largest residential facility for students, faculty members and supportive staff.

The University is presently offering 26 Post Graduate Degree programs, 35 Undergraduate programs in various branches of studies and has 15000+ students studying in various branches of knowledge at graduate and post graduate level and 494 Scholars pursuing research leading to PhD in 19 disciplines. It has 900+ well qualified, experienced and committed faculty members of whom majority are doctorates in their respective areas and most of them are guiding students pursuing research leading to PhD.

The programs being offered by the REVA University are well planned and designed after detailed study with emphasis on knowledge assimilation, applications, global job market and their social relevance. Highly qualified, experienced faculty and scholars from reputed universities / institutions, experts from industries and business sectors have contributed in preparing the scheme of instruction and detailed curricula for this program. Greater emphasis on practice in respective areas and skill development to suit to respective job environment has been given importance while designing the curricula. The Choice Based Credit System and Continuous Assessment Graded Pattern (CBCS – CAGP) of education has been introduced in all programs to facilitate students to opt for subjects of their choice in addition to the core subjects of the study and prepare them with needed skills. The system also allows students to move forward under the fast track for those who have the capabilities to surpass others. These programs are taught by well experienced qualified faculty supported by the experts from industries, business sectors and such other organizations. REVA University has also initiated many supportive measures such as bridge courses, special coaching, remedial classes, etc., for slow learners so as to give them the needed input and build in them confidence and courage to move forward and accomplish success in their career. The University has also entered into MOUs with many industries, business firms and other institutions seeking their help in imparting quality education through practice, internship and also assisting students' placements.

REVA University recognizing the fact that research, development and innovation are the important functions of any university has established an independent Research and Innovation division headed by a senior professor as Dean of Research and Innovation. This division facilitates all faculty members and research scholars to undertake innovative research projects in engineering, science & technology and other areas of study. The interdisciplinary-multidisciplinary research is given the top most priority. The division continuously liaisons between various funding agencies, R&D Institutions, Industries and faculty members of REVA University to facilitate undertaking innovative projects. It encourages student research projects by forming different research groups under the guidance of senior faculty members. Some of the core areas of research wherein our young faculty members are working include Data Mining, Cloud Computing, Image Processing, Network Security, Big data analytics, Information Retrival, VLSIand Embedded Systems, Wireless Sensor Networks, Artificial Intelligence, Computer Networks, IOT, MEMS, Nano- Electronics, Wireless Communications, Bio-fuels, Nano-technology for coatings, Composites, Vibration Energies, Electric Vehicles, Multilevel Inverter Application, Battery Management System, , LED Lighting, Renewable Energy Sources and Active Filter, Innovative Concrete Reinforcement, Electro Chemical Synthesis, Energy Conversion Devices, Nano-structural Materials, Photo-electrochemical Hydrogen generation, Pesticide Residue Analysis, Nano materials, Photonics, Nano Tribology, Fuel Mechanics, Operation Research, Graph theory, Strategic Leadership and Innovative Entrepreneurship, Functional Development Management, Resource Management and Sustainable Development, Cyber Security, General Studies, Feminism, Computer Assisted Language Teaching, Culture Studies etc.

The REVA University has also given utmost importance to develop much required skills through variety of training programs, industrial practice, case studies and such other activities that induce the said skills among all students. A full-fledged Career Development and Placement (CDC) department with world class infrastructure, headed by a dynamic experienced Professor and Dean, and supported by well experienced Trainers, Counselors and Placement Officers. The University also has University-Industry Interaction (UIIC) and Skill Development Centre headed by a Senior Professor and Director facilitating skill related training to REVA students and other unemployed students. The University has been recognized as a Centre of Skill Development and Training by NSDC (National Skill Development Corporation) under Pradhan Mantri Kaushal Vikas Yojana. The Centre conducts several add-on courses in challenging areas of development. It is always active in facilitating student's variety of Skill Development Training programs, Entrepreneurship activities, and IPR workshops. UIIC has established REVA NEST, an incubation center for promoting start up industries. The University has collaborations with Industries, universities abroad, research institutions, corporate training organizations, and Government agencies such as Florida International University, Okalahoma State University, Western Connecticut University, University of Alabama, University of California Berkeley, Arkansas State University, Columbia University, Huntsville, Oracle India Ltd, Texas Instruments, Nokia University Relations, EMC^2, VMware, SAP, Apollo etc, to facilitate student exchange and teacher–scholar exchange programs and conduct training programs. These collaborations with foreign universities also facilitates students to study some of the programs partly in REVA University and partly in foreign university, viz, M.S in Computer Science one year in REVA University and the next year in the University of Alabama, Huntsville, USA.

The University has also given greater importance to quality in education, research, administration and all activities of the university. Therefore, it has established an independent Internal Quality division headed by a senior professor as Dean of Internal Quality. The division works on planning, designing and developing different quality tools, implementing them and monitoring the implementation of these quality tools. It concentrates on training entire faculty to adopt the new tools and implement their use. The division further works on introducing various examination and administrative reforms.

To motivate the youth and transform them to become innovative entrepreneurs, successful leaders of tomorrow and committed citizens of the country, REVA organizes interaction between students and successful industrialists, entrepreneurs, scientists and such others from time to time. As a part of this exercise great personalities such as Bharat Ratna Prof. C. N. R. Rao, a renowned Scientist, Dr. N R Narayana Murthy, Founder and Chairman and Mentor of Infosys, Dr. K Kasturirangan, Former Chairman ISRO, Member of Planning Commission, Government of India, Dr. Balaram, Former Director I.I.Sc., and noted Scientist, Dr. V S Ramamurthy, Former Secretary, DST, Government of India, Dr. V K Aatre, noted Scientist and former head of the DRDO and Scientific Advisor to the Ministry of Defence Dr. Sathish Reddy, Scientific Advisor, Ministry of Defence, New Delhi and many others have accepted our invitation and blessed our students and faculty members by their inspiring addresses and interaction.

As a part of our effort in motivating and inspiring youth of today, REVA University also has instituted awards and prizes to recognize the services of teachers, researchers, scientists, entrepreneurs, social workers and such others who have contributed richly for the development of the society and progress of the country. One of such award instituted by REVA University is **'Life Time Achievement Award'** to be awarded to successful personalities who have made mark in their field of work. This award is presented on occasion of the **"Founders' Day Celebration"** of REVA University on 6th January of every year in presence of dignitaries, faculty members and students gathering. The first "**REVA Life Time Achievement Award**" for the year 2015 has been awarded to Shri. Kiran Kumar, Chairman ISRO, followed by Shri. Shekhar Gupta, renowned Journalist for the year 2016, Dr K J Yesudas, renowned play back singer for the year 2017. REVA also introduced "**REVA Award of Excellence"** in the year 2017 and the first Awardee of this prestigious award is Shri Ramesh Aravind, Actor, Producer, Director, Screen Writer and Speaker.

REVA organizes various cultural programs to promote culture, tradition, ethical and moral values to our students. During such cultural events the students are given opportunities to unfold their hidden talents and motivate them to contribute innovative ideas for the progress of the society. One of such cultural events is REVOTHASAVA conducted every year. The event not only gives opportunities to students of REVA but also students of other Universities and Colleges. During three days of this mega event students participate in debates, Quizzes, Group discussion, Seminars, exhibitions and variety of cultural events. Another important event is Shubha Vidaaya, - Graduation Day for the final year students of all the programs, wherein, the outgoing students are felicitated and are addressed by eminent personalities to take their future career in a right spirit, to be the good citizens and dedicate themselves to serve the society and make a mark in their respective spheres of activities. During this occasion, the students who have achieved top ranks and won medals and prizes in academic, cultural and sports activities are also recognized by distributing awards and prizes. The founders have also instituted medals and prizes for sports achievers every year. The physical

education department conducts regular yoga classes every day to students, faculty members, administrative staff and their family members and organizes yoga camps for villagers around.

Within short span of time, REVA University has been recognized as a fast growing university imparting quality higher education to the youth of the country and received many awards, ranks, and accolades from various agencies, institutions at national and international level. These include: Asia's Greatest Brand and Leaders, by Asia One, National Award of Leadership Excellence, by ASSOCHAM India, Most promising University, by EPSI, Promising Upcoming Private University in the Country, by The Economic Times, Best University of India (South), by Dialogue India, Gold Brand by QS University Ranking, placed under 151-200 band by NIRF, 6TH Rank in the Super Excellence category by GHRDC, 6TH Rank in All India Law School Survey, ranked among Top 30 Best B Schools by Business World, India's Best Law Institution by Careers 360, to mention a few.

Vision (REVA University Vision)

''REVA University aspires to become an innovative university by developing excellent human resources with leadership qualities, ethical and moral values, research culture and innovative skills through higher education of global standards".

Mission

To create excellent infrastructure facilities and state-of-the-art laboratories and incubation centers.

To provide student-centric learning environment through innovative pedagogy and education reforms.

To encourage research and entrepreneurship through collaborations and extension activities.

To promote industry-institute partnerships and share knowledge for innovation and development.

To organize society development programs for knowledge enhancement in thrust areas.

To enhance leadership qualities among the youth and enrich personality traits, promote patriotism and moral values.

Objectives

Creation, preservation and dissemination of knowledge and attainment of excellence in different disciplines.

Smooth transition from teacher - centric focus to learner - centric processes and activities.

Performing all the functions of interest to its major constituents like faculty, staff, students and the society to reach leadership position

Developing a sense of ethics in the University and Community, making it conscious of its obligations to the society and the nation

Accepting the challenges of globalization to offer high quality education and other services in a competitive manner.

ABOUT THE SCHOOL OF COMPUTING AND INFORMATION TECHNOLOGY (C & IT)

The School has a rich blend of experienced and committed faculty who are well qualified in various aspects of computing and information technology apart from the numerous state-of-the-art digital classrooms and laboratories having modern computing equipment. The School offers one undergraduate program: B Tech in Computer Science and Engineering. Two post graduate programs offered in the school are: M Tech in Data Engineering and Cloud Computing and M Tech in Computer Science and Engineering. In addition, the school has a unique academic collaboration with the University of Alabama in Huntsville to jointly offer an MS program in Computer Science. In addition, the school has a research center in which students can conduct cutting edge research leading to a PhD degree. Curricula of both undergraduate and postgraduate programs have been designed through a collaboration of academic and industry experts in order to bridge the growing gap between industry and academia.

This makes the program highly practical-oriented, and thus industry-resilient. The B Tech program aims to create quality human resources to play leading roles in the contemporary, competitive industrial and corporate world. The masters' degrees focus on quality research and design in the core and application areas of computing to foster a sustainable world and to enhance the global quality of life by adopting enhanced design techniques and applications. This thought is reflected in the various courses offered in the masters' programs.

Vision

To create a pool of high-caliber engineers and researchers in computer science and information technology contributing to the development of the nation and the society with their expertise, skills, innovative problem-solving abilities and strong ethical values.

Mission

Create a center of excellence where new ideas flourish and from which emerge tomorrow's researchers, scholars, leaders and innovators.

Provide quality education in both theoretical and applied foundations of computer science, information technology and related inter-disciplinary areas and to train students to effectively apply the education to solve real-world problems.

Amplify students' potential for life-long high-quality careers and give them a competitive advantage in the ever-changing and challenging global work environment of the 21st century.

Forge research and academic collaboration with industries and top global universities in order to provide students with greater opportunities.

Support the society by encouraging and participating in technology transfer.

Sl.No	Name and Designation of the Members
1	**Mr. Himesh Misra, Program Director**, IBM Innovation Center, IBM India Private Limited Bengaluru
2	**Dr. Rajkumar Buyya, Director**, Cloud Computing and Distributed Systems Laboratory Department of Computing and Information Systems University of Melbourne, Australia
3	**Mr. ChethanShivkumar, Founding Director**, AIKAAN Labs, Bengaluru
4	**Mr. P. B. Kotur, Global Goodwill Ambassador** Wipro Limited Bengaluru, India
5	**Dr. Sajal Das, Professor,** Department of CS&E Missouri University of Science and Technology, USA
6	**Dr. Heggere S. Ranganath, Professor and Chair**, Computer Science Department University of Alabama in Huntsville Huntsville, USA
7	**Mr. Mrityunjay Hiremath, Director,** AMD Inc. USA, Bengaluru, India

MEMBERS OF BOARD OF STUDIES

Sl. No	Name and Affiliation	Role
1	**Dr Sunil Kumar S Manvi, Professor and Director** School of C & IT, REVA University	Chairman
2	**Dr Mallikarjuna Shastry P M, Professor** School of C & IT, REVA University	Member
3	**Dr Kiran Kumari Patil, Director UIIC** REVA University	Member
4	**Prof Ashwin Kumar U M, Associate Professor**, School of C & IT, REVA University	Member
5	**Dr Gopala Krishna Shyam, Associate Professor,** School of C & IT, REVA University	Member
6	**Mr. Chetan Shivakumar, CEO & Cofounder,** Aikaan Labs Pvt Ltd, Bengaluru.	Member
7	**Mr. MuralidharJahagirdhar, Practice Head Engineering**, ATMECS Technology Pvt Ltd, Hyderabad	Member
8	**Mr. RavikantSoni, Technical Manager, Solution Architect**, Standard Chartered bank, Bengaluru.	Member
9	**Dr Sanjay, HoD Dept. of ISE**, NITTE Meenakshi Institute of Technology, Bengaluru	Member
10	**Dr Raghavendra Kulkarni, Director of Academics**, M. S. Ramaiah University of Applied Sciences, Bengaluru	Member

Program Overview

Computer Science Engineering (CSE) encompasses a variety of topics that relates to computation, like development of algorithms, analysis of algorithms, programming languages, software design and computer hardware. Computer Science engineering has roots in electrical engineering, mathematics, and linguistics. In the past Computer Science was taught as part of mathematics or engineering departments and in the last 3 decades it has emerged as a separate engineering field. In the present information era (Knowledge era) computer science and engineering will see an exponential growth as the future machines work on artificial intelligence.

The oldest known complex computing device, called the Antikythera mechanism, dates to 87 B.C., to calculate astronomical positions and help Greeks navigate through the seas. Computing took another leap in 1843, when English mathematician Ada Lovelace wrote the first computer algorithm, in collaboration with Charles Babbage, who devised a theory of the first programmable computer. But the modern computing-machine era began with Alan Turing's conception of the Turing Machine, and three Bell Labs scientists invention of the transistor, which made modern-style computing possible, and landed them the 1956 Nobel Prize in Physics. For decades, computing technology was exclusive to the government and the military; later, academic institutions came online, and Steve Wozniak built the circuit board for Apple-1, making home computing practicable. On the connectivity side, Tim Berners- Lee created the World Wide Web, and Marc Andreessen built a browser, and that's how we came to live in a world where our glasses can tell us what we're looking at. With wearable computers, embeddable chips, smart appliances, and other advances in progress and on the horizon, the journey towards building smarter, faster and more capable computers is clearly just beginning.

Computers have become ubiquitous part of modern life, and new applications are introduced everyday
. The use of computer technologies is also commonplace in all types of organizations, in academia, research, industry, government, private and business organizations. As computers become even more pervasive, the potential for computer-related careers will continue to grow and the career paths in computer-related fields will become more diverse. Since 2001, global information and communication technologies (ICTs) have become more powerful, more accessible, and more widespread. They are now pivotal in enhancing competitiveness, enabling development, and bringing progress to all levels of society.

The career opportunities for computer science and engineering graduates are plenty and growing. Programming and software development, information systems operation and management, telecommunications and networking, computer science research, web and Internet, graphics and multimedia, training and support, and computer industry specialists are some of the opportunities the graduates find.

The School of Computing and Information Technology at REVA UNIVERSITY offers B. Tech.in Computer

Science and Engineering programme to create motivated, innovative, creative thinking graduates to fill ICT positions across sectors who can conceptualize, design, analyse, and develop ICT applications to meet the modern-day requirements.

The B. Tech., in Computer Science and Engineering curriculum developed by the faculty at the School of Computing and Information Technology, is outcome based and it comprises required theoretical concepts and practical skills in the domain. By undergoing this programme, students develop critical, innovative, creative thinking and problem-solving abilities for a smooth transition from academic to real-life work environment. In addition, students are trained in interdisciplinary topics and attitudinal skills to enhance their scope. The above-mentioned features of the programme, advanced teaching and learning resources, and experience of the faculty members with their strong connections with ICT sector makes this programme unique.

Program Educational Objectives (PEOs)

The program helps to develop critical, analytical, innovative, creative and problem-solving abilities amongst its graduates. The programme makes the graduates employable as Software Engineers across sectors. With further education and earning of higher level degrees help the graduates to pursue a career in academics or scientific organizations as researchers.

The Program Educational Objectives (PEOs) :

PEO-1	Have successful professional careers in industry, government, academia and military as innovative engineer in a team
PEO-2	Develop code and solutions to industry in a rapid changing technology environment and communicate with clients as an entrepreneur
PEO-3	Pursue higher studies and continue to learn by participating conferences, seminars etc

Program Outcomes (POs)

After undergoing this programme, a student will be able to:

PO1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals for the solution of complex problems in Computer Science and Engineering.

PO2. Problem analysis: Identify, formulate, research literature, and analyze engineering problems to arrive at substantiated conclusions using first principles of mathematics, natural, and engineering sciences.

PO3. Design/development of solutions: Design solutions for complex engineering problems and design system components, processes to meet the specifications with consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4. Conduct investigations of complex problems: Use research-based knowledge including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice

PO9. Individual and teamwork: Function effectively as an individual, and as a member or leader in teams, and in multidisciplinary settings.

PO10. Communication: Communicate effectively with the engineering community and with society at large. Be able to comprehend and write effective reports documentation. Make effective presentations and give **and receive clear instructions.**

PO11. Project management and finance: Demonstrate knowledge and understanding of engineering and management principles and apply these to one's own work, as a member and leader in a team. Manage projects in multidisciplinary environments.

PO12. Life-long learning: Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Specific Outcomes (PSO)

After successful completion of the programme, the graduates will be able to

1. Demonstrate the knowledge of Data structures and Algorithms, Operating Systems, Database Systems, Software Engineering, Programming Languages, Digital systems, Theoretical Computer Science, and Computer Networks.

2. Solve latest problems and develop code to address the requirements of Industry through programming.

3. Use modern tools and techniques in the area of Computer Science and Engineering.

Summary of REVA University Regulations for Choice Based Credit System (CBCS) and Continuous Assessment Grading Pattern (CAGP) for Four Year

Graduate Degree Programs

1. Teaching and Learning Process:

The Teaching & Learning process under CBCS – CAGP of education in each course of study will have three components, namely**:** L:T:P.

(i) L= Lecture (ii) T= Tutorial (iii) P=Practice, where:

L stands for **Lecture** session consisting of classroom instruction.

T stands for **Tutorial** session consisting participatory discussion / self-study/ desk work/ brief seminar presentations by students and such other novel methods that make a student to absorb and assimilate more effectively the contents delivered in the Lecture classes.

P stands for **Practice** session and it consists of Hands-on Experience / Laboratory Experiments / Field Studies / Case Studies that equip students to acquire the much-required skill component.

2. Courses of Study and Credits

a. The study of various subjects in B Tech degree program are grouped under various courses. Each of these course carries credits which are based on the number of hours of teaching and learning.

b. In terms of credits, every **one-hour session of L amounts to 1 credit per Semester** and a minimum of **two-hour session of T or P amounts to 1 credit per Semester or a three-hour session of T/P amounts to 2 credits** over a period of one Semester of 16 weeks for teaching-learning process.

c. The total duration of a semester is 20 weeks inclusive of semester-end examination.

d. **A course shall have either or all the four components.** That means a course may have only lecture component, or only practical component or combination of any two or all the three components.

e. The total credits earned by a student at the end of the semester upon successfully completing the course are L + T +P.

3. Courses of Study

Different C**ourses of Study** are labeled and defined as follows:

a. Core Course:

A course which should compulsorily be studied by a candidate as a core-requirement is termed as a Core course. The CORE courses of Study are of THREE types, viz–

(i) Foundation Course, (ii) Hard Core Course, and (iii) Soft Core Course.

b. Foundation Course (FC):

The foundation Course is a core course which should be completed successfully as a part of graduate degree program irrespective of the branch of study.

c. Hard Core Course (HC):

The **Hard-Core Course** is a Core Course in the main branch of study and related branch(es) of study, if any, that the candidates have to complete compulsorily.

d. Soft Core Course (SC):

A Core course may be a **Soft Core** if there is a choice or an option for the candidate to choose a course from a pool of courses from the main branch of study or from a sister/related branch of study which supports the main branch of study.

e. Open Elective Course (OE):

An elective course chosen generally from other discipline / subject, with an intention to seek exposure to the basics of subjects other than the main discipline the student is studying is called an O**pen Elective Course.**

f. Project Work /Dissertation:

Project work / Dissertation work is a special course involving application of knowledge in solving / analyzing /exploring a real-life situation / difficult problem. A project work carrying **FOUR or SIX** credits is called **Minor Project** work/**Dissertation.** A project work of **EIGHT, TEN, TWELVE or SIXTEEN** credits is called **Major Project** work/**Dissertation**. **A Minor Project work may be a hard core or a Soft Core as decided by the BoS / concerned. But the Major Project shall be Hard-core.**

3. Scheme, Duration and Medium of Instructions:

3.1 B Tech degree program is of 8 semesters - 4 years duration. A candidate can avail a maximum of16semesters-8years as per double duration norm, in one stretch to complete BTech degree, including blank semesters, if any. Whenever a candidate opts for blank semester, he/she has to study the prevailing courses offered by the School when he/she resumes his/her studies.

3.2 The medium of instruction shall be English.

4. Minimum Credits to be Earned

4.1 **A candidate has to earn 192 credits for successful completion of B Tech degree** with the distribution of credits for different courses as prescribed by the university. A candidate can enroll for a maximum of 32 credits and a minimum of 20 credits per Semester.

4.2 However he/she may not successfully earn a maximum of 32 credits per semester. This maximum of 32 credits does not include the credits of courses carried forward by a candidate.

4.3 Only such full-time candidates who register for a minimum prescribed number of credits in each

semester from I semester to VIII semester and complete successfully 192 credits in 8 successive semesters shall be considered for declaration of Ranks, Medals, Prizes and are eligible to apply for Student Fellowship, Scholarship, Free ships, and such other rewards / advantages which could be applicable for all full-time students and for hostel facilities.

4.3. Add- on Proficiency Certification:

To acquire **Add on Proficiency Certification** a candidate can opt to complete a minimum of 4 extra credits either in the same discipline /subject or in different discipline / subject in excess to 192 credits for the B Tech Degree program.

4.3.1. Add on Proficiency Diploma:

To acquire **Add on Proficiency Diploma,** a candidate can opt to complete a minimum of 18 extra credits either in the same discipline /subject or in different discipline / subject in excess to 192 credits for the B Tech Degree program.

The A**dd on Proficiency Certification/Diploma** so issued to the candidate contains the courses studied and grades earned.

5. Scheme of Assessment and Evaluation

5.1. The Scheme of Assessment and Evaluation will have two parts, namely;

i. Internal Assessment (IA); and
ii. Semester End Examination (SEE)

5.2. Assessment and Evaluation of each Course shall be for 100 marks. The Internal Assessment (IA) and Semester

End Examination (SEE) of UG Engineering programs shall carry 40:60 marks respectively (i.e., 40 marks internal assessment; 60 marks semester end examination).

5.3. The 40 marks of internal assessment shall comprise of:

Internal Test	= 30marks
Assignments / Seminars / Model Making etc.	= 10marks

6. Assessment of Performance in Practical's

6.1. The performance in the practice tasks / experiments shall be assessed on the basis of:

a) Knowledge of relevant processes;

b) Skills and operations involved;

c) Results / products including calculation and reporting.

6.2. The 40 marks meant for Internal Assessment (IA) of the performance in carrying out practical shall further be allocated asunder:

i	Conduction of regular practical / experiments throughout the semester	20 marks
ii	Maintenance of lab records	10 marks
iii	Performance of mid-term test (to be conducted while conducting second test for theory courses); the performance assessments of the mid-term test includes performance in the conduction of experiment and write up about the experiment.	10 marks
	Total	**40 marks**

6.3. The 60 marks meant for Semester End Examination (SEE), shall be allocated as under:

i	Conduction of semester end practical examination	40 marks
ii	Write up about the experiment / practical conducted	10 marks
iii	Viva Voce	10 marks
	Total	**60 marks**

6.4. The duration for semester-end practical examination shall be decided by the concerned School Board.

7. Evaluation of Minor Project / Major Project /Dissertation:

7.1. Right from the initial stage of defining the problem, the can did at has to submit the progress reports periodically and also present his/her progress in the form of seminars in addition to the regular discussion with the supervisor. At the end of the semester, the candidate has to submit final report of the project/ dissertation, as the case maybe, for final evaluation. The components of evaluation are as follows:

Component – I	Periodic Progress and Progress Reports (25%)
Component – II	Results of Work and Draft Report (25%)
Component– III	Final Evaluation and Viva-Voce (50%). Evaluation of the report is for 30% and the Viva-Voce examination is for 20%.

8. Provision for Appeal

If a candidate is not satisfied with the evaluation of Internal Assessment components (Mid-term Tests and Assignments), he/she can approach the grievance cell with the written submission together with all facts, the assignments, test papers etc, which were evaluated. He/she can do so before the commencement of respective semester-end examination. The grievance cell is empowered to revise the marks if the case is genuine and is also empowered to levy penalty as prescribed by the university on the candidate if his/her

submission is found to be baseless and unduly motivated. This cell may recommend taking disciplinary/corrective action on an evaluator if he/she is found guilty. The decision taken by the grievance cell is final.

For every program there will be one grievance cell. The composition of the grievance cell is as follows:-

- The Registrar (Evaluation) - Ex-officio Chairman /Convener
- One Senior Faculty Member (other than those concerned with the evaluation of the course concerned) drawn from the school / department/discipline and/or from the sister schools / departments/sister disciplines –Member.
- One Senior Faculty Members / Subject Experts drawn from outside the University school / department –Member.

9. Eligibility to Appear for Semester End Examination (SEE)

Only those students who fulfill a minimum of 75% attendance in aggregate of all the courses including practical courses / field visits etc, as part of the program, as provided in the succeeding sections, shall be eligible to appear for Semester End examination.

10. Requirements to Pass the Semester and to Carry Forward the Failed Subjects / Courses:

10.1 Requirements to Pass a Course

A candidate's performance from IA and SEE will be in terms of scores, and the sum of IA and SEE scores will be for a maximum of 100 marks (IA = 40 + SEE = 60) and have to secure a minimum of 40% to declare pass in the course. However, a candidate has to secure a minimum of 25%(15marks) in Semester End Examination (SEE) which is compulsory.

10.2 Provision to Carry Forward the Failed Subjects /Courses:

The total number of "F" Grades that can be carried forward by a student at the end of any even semester shall not be more than four courses.

10.3. Re-Registration and Re-Admission:

a) In case a candidate's class attendance in aggregate of all courses in a semester is less than 75% or as stipulated by the University, such a candidate is considered as dropped the semester and is not allowed to appear for end semester examination and he/she shall have to seek re-admission to that semester during subsequent semester/year within stipulated period.

b) In such case where in a candidate drops all the courses in a semester due to personal reasons, it is considered that the candidate has dropped the semester and he/she shall seek re- admission to such dropped semester.

11. Attendance Requirement:

11.1. All students must attend every lecture, tutorial and practical classes.

11.2. In case a student is on approved leave of absence (eg:- representing the university in sports, games or athletics, placement activities, NCC, NSS activities and such others) and / or any other such contingencies like medical emergencies, the attendance requirement shall be minimum of 75% of the classes taught.

11.3. Any student with less than 75% of attendance in aggregate of all the courses including practical courses / field visits etc, during a semester shall not be permitted to appear to the end semester examination and such student shall seek re-admission as provided in10.3.

11.4. Teachers offering the courses will place the above details in the School Board meeting during the last week of the semester, before the commencement of Semester end examination, and subsequently a notification.

11.5. pertaining to the above will be brought out by the Director of the School before the commencement of Semester end examination. A copy of this notification shall also be sent to the office of the Registrar & Registrar(Evaluation).

11.6. Absence during Internal Test:

In case a student has been absent from a internal tests due to the illness or other contingencies he /she may give a request along with necessary supporting documents and certification from the concerned class teacher/authorized personnel to the concerned Head of the School, for conducting a separate internal test. The Head of the School may consider such request depending on the merit of the case and after consultation with course instructor and class teacher and arrange to conduct a special internal test for such candidate(s)well in advance before the Semester end examination of that respective semester. Under no circumstances internal tests shall be held / assignments are accepted after Semester end examination.

12. Grade Card and Grade Point

12.1. Provisional Grade Card: The tentative / provisional grade card will be issued by the Registrar (Evaluation) at the end of every semester indicating the courses completed successfully. The provisional grade card provides **Semester Grade Point Average**(SGPA).

12.2. Final Grade Card: Upon successful completion of B Tech Degree a Final Grade card consisting of grades of all courses successfully completed by the candidate will be issued by the Registrar(Evaluation).

12.3. The Grade and the Grade Point: The Grade and the Grade Point earned by the candidate in the subject will be as given below.

Marks P	Grade G	Grade Point (GP=V x G)	Letter Grade
90 >100	10	v*10	O
80 > 90	9	v*9	A+
70 > 80	8	v*8	A
60 > 70	7	v*7	B+
55 > 60	6	v*6	B
50 > 55	5.5	V*5.5	C+
40 > 50	5	v*5	C
0-40	0	v*0	F

ABSENT	AB

O - Outstanding; A+-Excellent; A-Very Good; B+-Good; B-Above Average; C+-Average; C-Satisfactory; F – Unsatisfactory.

Here, P is the percentage of marks (P=[IA+SEE]) secured by a candidate in a course which is **rounded to nearest integer**. V is the credit value of course. G is the grade and GP is the Grade point.

12.3.1. Computation of SGPA and CGPA

The Following procedure to compute the Semester Grade Point Average (SGPA)

The SGPA is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student in a given semester, i.e : **SGPA (Si) = ∑(Ci x Gi) / ∑Ci** where Ci is the number of credits of the i^{th} course and Gi is the grade point scored by the student in the i^{th} course.

Illustration for Computation of SGPA and CGPA

Illustration No. 1

Course	Credit	Grade Letter	Grade Point	Credit Point (Credit x Grade)
Course 1	4	A+	9	4X9=36
Course 2	4	A	8	4X8=32
Course 3	3	B+	7	3X7=21
Course 4	3	O	10	3X10=30
Course 5	3	C	5	3X5=15
Course 6	3	B	6	3X6=18
Course 7	2	O	10	2X10=20
Course 8	2	A	8	2X8=16
	24			188

Thus, **SGPA = 188 ÷ 24 = 7.83**

Illustration No. 2

Course	Credit	Grade letter	Grade Point	Credit Point (Credit x Grade point)
Course 1	4	A	8	4X8=32
Course 2	4	B+	7	4X7=28
Course 3	3	A+	9	3X9=27
Course 4	3	B+	7	3X7=21
Course 5	3	B	6	3X6=18
Course 6	3	C	5	3X5=15
Course 7	2	B+	7	2X7=21
Course 8	2	O	10	2X10=20
	24			175

Thus, **SGPA = 175 ÷ 24 = 7.29**

Illustration No.3

Course	Credit	Grade Letter	Grade Point	Credit Point (Credit x Grade point)
Course 1	4	O	10	4 x 10 = 40
Course 2	4	A+	9	4 x 9 = 36
Course 3	3	B+	7	3 x 7 = 21
Course 4	3	B	6	3 x 6 = 18
Course 5	3	A+	9	3 x 9 = 27
Course 6	3	B+	7	3 x 7 = 21
Course 7	2	A+	9	2 x 9 = 18
Course 8	2	A+	9	2 x 9 = 18
	24			**199**

Thus**, SGPA = 199 ÷ 24 = 8.29**

12.4. Cumulative Grade Point Average(CGPA):

12.4.1. Overall Cumulative Grade Point Average (CGPA) of a candidate after successful completion of the required number of credits (192) for B. Tech degree in Engineering & Technology is calculated taking into account all the courses undergone by a student over all the semesters of a program, i. e : **CGPA = ∑(Ci x Si) /∑Ci**

Where Si is the SGPA of the i^{th} semester and Ci is the total number of credits in that semester. The SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.

Illustration:
CGPA after Final Semester

Semester (ith)	No. of Credits (Ci)	SGPA (Si)	Credits x SGPA (Ci X Si)
1	24	6.83	24 x 6.83 = 163.92
2	24	7.29	24 x 7.29 = 174.96
3	24	8.11	24 x 8.11 = 192.64
4	26	7.40	26 x 7.40 = 192.4
5	26	8.29	26 x 8.29 = 215.54
6	24	8.58	24 x 8.58 = 205.92
7	24	9.12	24 x 9.12 = 218.88
8	24	9.25	24 x 9.25 =222
Cumulative	196		1588.26

Thus, **CGPA** = 24x6.83+24x7.29+24x8.11+26x7.40+26x8.29+24x8.58+24x9.12+24x9.25 = 8.10 196

12.4.2. CONVERSION OF GRADES INTO PERCENTAGE:

Conversion formula for the conversion of CGPA into Percentage is:
Percentage of marks scored = CGPA Earned x 10
Illustration: CGPA Earned 8.10 x 10=81.0

12.5. Classification of Results

The final grade point (FGP) to be awarded to the student is based on CGPA secured by the candidate and is given as follows.

CGPA	Grade (Numerical Index)	Letter Grade	Performance	FGP
	G			Qualitative Index
9 >= CGPA 10	10	O	Outstanding	Distinction
8 >= CGPA < 9	9	A+	Excellent	
7 >= CGPA < 8	8	A	Very Good	First Class
6 >= CGPA < 7	7	B+	Good	
5.5> = CGPA < 6	6	B	Above average	Second Class
> 5 CGPA < 5.5	5.5	C+	Average	
> 4 CGPA <5	5	C	Satisfactory	Pass

Overall percentage=10*CGPA

13. Challenge Valuation:

a. A student who desires to apply for challenge valuation shall obtain a photo copy of the answer script(s) of semester end examination by paying the prescribed fee within 10 days after the announcement of the results. He / She can challenge the grade awarded to him/her by surrendering the grade card and by submitting an application along with the prescribed fee to the Registrar (Evaluation) within 10 days after the announcement of the results. **This challenge valuation is only for semester end examination.**

b. The answer scripts for which challenge valuation is sought for shall be evaluated by the external examiner who has not involved in the first evaluation. The higher of two marks from first valuation and challenge valuation shall be the final.

14. With regard to any specific case of ambiguity and unsolved problem, the decision of the Vice-Chancellor shall be final.

B. Tech in Computer Science and Engineering for the Batch 2017-21

Eligibility for Admission:

The eligibility criteria for admission to B Tech Program of 4 years (8 Semesters) are given below:

Sl. No.	Program	Duration	Eligibility
1	Bachelor of Technology (B Tech)	4 Years	Passed 10+2 examination with Physics and Mathematics as compulsory subjects along with one of the Chemistry Biotechnology / Biology / Technical Vocational subject Obtained at least 45% marks (40% in case of candidate belonging to SC/ST category) in the above subjects taken together
2	Bachelor of Technology (B Tech)	Lateral entry to second year	(A) Passed Diploma examination from an AICTE approved Institution with atleast 45% marks (40% in case of candidates belonging to SC/ST category) in appropriate branch of Engineering /Technology. (B) Passed B. Sc Degree from a recognized University as defined by UGC, with atleast 45% marks (40% in case of candidates belonging to SC/ST category) and passed XII standard with mathematics as a subject. (C) Provided that in case of student sbe longing to B.Sc. Stream, shall clear the subjects of Engineering Graphics/Engineering Drawing and Engineering Mechanics of the first year Engineering program along with the second yearsubjects. (D) Provided further that, the students belonging to B. Sc. Stream shall be considered only after filling the seats in this category with students belonging to the Diploma stream. (E) Provided further that student, who have passed Diploma in Engineering & Technology from an AICTE approved Institution or B. Sc Degree from a recognized University as defined by UGC, shall also be eligible for admission to the first year Engineering Degree courses subject to vacancies in the first-year class in case the vacancies at lateral entry are exhausted. However the admissions shall be based strictly on the eligibility criteria as mentioned in A, B, D, and E above.
3	Bachelor of Technology (BTech)	Lateral entry to fourth ye ar (final year)	(F) Provided further that Students who successfully completed six Semesters in REVA University and have exited with Advanced Diploma in Engineering &Technology (ADET) shall be eligible for admission to the Fourth year B Tech degree courses subject to the vacancies. (G) Any candidate with genuine reason from any University / Institution in the country upon credit transfer could be considered for lateral admission to the respective semester in the concerned branch of study.

Scheme

and

Syllabus of

B. Tech in Computer Science and Engineering

for

2017-21

Rukmini Educational

CharitableTrust

A UNIT – of DivyaSree

REVA UNIVERSITY

SCHOOL OF COMPUTING AND INFORMATION TECHNOLOGY

Scheme of Instructions and

Syllabus Approved

by

Board of Studies

Ref: BOS/CIT/BCS/2013-14/2/04-02-2014

Ref: BOS/CIT/BCS/2014-15/3/14-03-2015

Ref: BOS/CIT/BCS/2015-16/4/02-04-2016

Ref: BOS/CIT/BCS/2016-17/5/08-04-2017

B. Tech in Computer Science and Engineering

Batch: 2017-21

Scheme of Instructions and Syllabus

Batch 2017-2021
B.Tech – I / II Semester

Scheme for I Semester									
PHYSICS CYCLE									
Sl. No	**Course code**	**Title of the Course**	**Types of course HC/ SC/OE**	**Credit Pattern & Credit Value**				**Contact Hrs**	**Teaching School/Dept**
				L	**T**	**P**	**Total**		
1	BTEM15F1100	Engineering Mathematics – I	HC	3	1	0	4	5	Mathematics
2	BTEP15F1200	Engineering Physics	HC	2	1	0	3	4	Physics
3	BTCV15F1300	Elements of Civil Engineering	HC	2	1	0	3	4	Civil
4	BTME15F1400	Elements of Mechanical Engineering	HC	2	1	0	3	4	Mechanical
5	BTEE15F1500	Basic Electrical Engineering	HC	2	1	0	3	4	Electrical
6	BTIC15F1600	Indian Constitution and Professional Ethics	FC	1	1	0	2	3	Humanities
7	BTCE15F1700	Technical English – I	FC	1	1	0	2	3	Humanities
8	BTPL15F1800	Engineering Physics Lab	HC	0	0	2	2	3	Physics
9	BTEW15F1900	Basic Electrical Engineering lab	HC	0	0	2	2	3	Electrical
Total Credits				**13**	**7**	**4**	**24**	**33**	
Scheme for II Semester									
CHEMISTRY CYCLE									
1	BTEM15F2100	Engineering Mathematics – II	HC	3	1	0	4	5	Mathematics
2	BTEC15F2200	Engineering Chemistry	HC	2	1	0	3	4	Chemistry
3	BTEC15F2300	Basic Electronics Engineering	HC	2	0	0	3	4	Electronics
4	BTCC15F2400	Computer Concepts & C Programming	HC	2	1	0	3	4	CSE
5	BTES15F2500	Environmental Sciences	FC	1	1	0	2	3	Civil
6	BTCC15F2600	Technical English – II	FC	1	1	0	2	3	Humanities
7	BTED15F2700	Computer Aided Engineering Drawing	HC	2	0	2	4	6	Mechanical
8	BTCL15F2800	Engineering Chemistry Lab	HC	0	0	2	2	3	Chemistry
9	BTCP15F2900	Computer Programming Lab	HC	0	0	2	2	3	CSE
Total Credits				**13**	**6**	**6**	**25**	**35**	

Scheme of Instructions for B.Tech in CSE– III to VIII Semester for 2017-21 Batch

Course Code		Course Title	Course Type	Credit Pattern and Credit Value				Contact Hrs.	Teaching School/ Dept.
				L	T	P	C		
Third Semester									
1	BTCS15F3100	Discrete Mathematical Structures	HC	2	1	0	3	4	Mathematics
2	BTCS15F3200	Data Structures and Algorithms	HC	2	1	0	3	4	C&IT
3	BTCS15F3300	Advanced Computer Programming	HC	2	1	1	4	6	C&IT
4	BTCS15F3400	Digital Principles and Logic Design	HC	2	1	0	3	4	C&IT
5	BTCS15F3500	Computer Organization and Architecture	HC	3	1	0	4	5	C&IT
6	BTCS15F3600	Engineering Mathematics-III	HC	3	1	0	4	5	Mathematics
7	BTCS15F3700	Data Structures Lab	HC	0	0	2	2	3	C&IT
8	BTCS15F3800	Logic Design& Electronic Circuits Lab	HC	0	0	2	2	3	C&IT
Total Credits for the Third Semester:							**25**	34	
Fourth Semester									
1	BTCS15F4100	Graph Theory	HC	3	1	0	4	5	Mathematics
2	BTCS15F4200	Engineering Mathematics-IV	HC	2	1	0	3	4	Mathematics
3	BTCS15F4300	Design and Analysis of Algorithms	HC	2	1	0	3	4	C&IT
4	BTCS15F4400	Microcontrollers	HC	2	1	0	3	4	C&IT
5	BTCS15F4500	Finite Automata and Formal Languages	HC	3	1	0	4	5	C&IT
6	BTCS15F4600	System Software	HC	3	0	1	4	5	C&IT
7	BTCS15F4700	Design and Analysis of Algorithms Lab	HC	0	0	2	2	3	C&IT
8	BTCS15F4800	Microcontrollers Lab	HC	0	0	2	2	3	C&IT
Total Credits for the Fourth Semester:							**25**	33	
Fifth Semester									
1	BTCS15F5100	Operating System and Unix Internals	HC	3	0	0	3	3	C&IT
2	BTCS15F5200	Object Oriented Programming using C++	HC	3	0	1	4	5	C&IT
3	BTCS15F5300	Database Management System	HC	3	0	0	3	3	C&IT
4	BTCS15F5400	Software Ethics and Project Management	HC	3	0	0	3	3	C&IT
5	BTCS15F5500	Computer Network Concepts and Protocols	HC	3	1	0	4	5	C&IT
6	BTCS15F56X0	Soft-core Group 1 (SC-1)	SC	-	-	-	3	-	C&IT
7	BTCS15F5700	Operating System Lab	HC	0	0	2	2	3	C&IT
8	BTCS15F5800	Database Management System Lab	HC	0	0	2	2	3	C&IT
Total Credits for the Fifth Semester:							**24**	25	
Sixth Semester									

1	BTCS15F6100	Software Engineering and Testing	HC	3	0	1	4	5	C&IT
2	BTCS15F6200	Virtualization and Cloud Computing	HC	3	1	0	4	5	C&IT
3	BTCS15F6300	Cryptography and Network Security	HC	3	0	0	3	3	C&IT
4	BTCS15F64X0	Soft-core Group 2 (SC-2)	SC	-	-	-	4	-	C&IT
5	BTCS15F65X0	Soft-core Group 3 (SC-3)	SC	-	-	-	4	-	C&IT
6	BTCS15F6600	Computer Network Simulation & Programming Lab	HC	0	0	2	2	3	C&IT
7	BTCS15F6700	Mini Project	HC	0	1	3	4	8	C&IT
Total Credits for the Sixth Semester:							**25**		
Seventh Semester									
1	BTCS15F7100	Machine Learning and Applications	HC	3	0	1	4	5	C&IT
2	BTCS15F7200	**Open Elective**	OE	-	-	-	4	-	Other Depts
3	BTCS15F73X0	Softcore Group 4 (SC-4)	SC	-	-	-	4	4	C&IT
4	BTCS15F74X0	Softcore Group 5 (SC-5)	SC	-	-	-	4	4	C&IT
5	BTCS15F75X0	Softcore Group 6 (SC-6)	SC	-	-	-	4	-	C&IT
6	BTCS15F7600	Cloud Computing Lab	HC	0	0	2	2	4	C&IT
7	BTCS15F7700	Web Applications Lab	HC	0	0	2	2	4	C&IT
8	BTCS15F7800	Project Work Phase-1	HC	0	0	0	2	-	C&IT
Total Credits for the Seventh Semester:							**26**		
Eighth Semester (Choose any one option) **Option- 1: Course Work and Project**									
1	BTCS15F81X0	Softcore Group 7 (SC-7)	SC	-	-	-	4	-	C&IT
2	BTCS15F82X0	Softcore Group 8 (SC-8)	SC	-	-	-	4	-	C&IT
3	BTCS15F8300	Project Work Phase-2	**HC**	**0**	**2***	**8**	**10**	**14**	**C&IT**
Total Credits for the Eighth Semester with Option-1:							**18**		
Option- 2: Internship and Project									
1	BTCS15F8400	Internship	SC	-	-	-	8	-	C&IT
2	BTCS15F8300	Project Work Phase-2	**HC**	**0**	**2***	**8**	**10**	**14**	**C&IT**
Total Credits for the Eighth Semester withOption-2:							**18**		
Opton-3: Skill Development and Project									
1	BTCS15F8100	Global Certification Program-1	**SC**	-	-	-	4		C&IT
2	BTCS15F8200	Global Certification Program-2	**SC**	-	-	-	4		C&IT
3	BTCS15F8300	Project Work Phase-2	HC	0	2*	8	10	14	C&IT
Total Credits for the Eighth Semester withOption-3:							**18**		

S **Total Credits for all Eight Semesters:**	**192**

***Project work done in 8th semester should be published in a reputed National/International Journal to earn 2 credits.**

Guide lines for Internship/Project Work/Global Certification Programs

1. **Internship:** should be carried out in a reputed /Tier-1/R & D organization, preferably, internship should be with stipend. The internship should be approved by the REVA University authorities before completion of 3rd semester and the students should obtain the permission for the same by producing the necessary details of company, selection process, and the offer letter issued by the company. At the end of the Internship, detailed report must be submitted.
2. Students can take-up the **internship** only if it is approved by RU authorities.

3. **Project work phase 1** comprises of literature survey, review paper writing, and problem formulation, identification of tools and techniques, and methodology for the project. **Project work phase – 2**, in 4th semester should have an outcome: publication in a reputed National/International Journal or a patent filing to earn 2 credits
4. **Global Certification programs:** Students have to register for global certification programs of their choice such as networking, JAVA, ORACLE, etc. The students can also choose skill development programs conducted by the UIIC or School, which may not be globally certified. However, weightage is more for global certification courses (10% weightage is accounted less for non-global programs). The registration must happen before beginning of the third semester.

Guidelines for Evaluation of Project Work/Internship/ Skill Development Global Certification Program

1. Evaluation of Major/MinorProject

Sl.No	Examination	Max. Marks	Requirements/Documents To Be Submitted	Tentative Schedule
1	C1	25	1.Synopsis Report 2.Weekly progress Reports 3.Presentation	6 weeks from semester start date
2	C2	25	1. MID-TERM report 2. Weekly progress Reports 3. Presenation	6 weeks from C1
3	C3	20 marks for Viva 30 marks for Thesis Total 50	1.Thesis Report 2. Weekly Progress Reports. 3.FinalPresentation	Two weeks from C2

2. Evaluation ofInternship

Sl.No.	Exam	Max.Marks	Documents To Be Submitted	Tentative Scheduling
1	C1	25	1.Synopsis Report/PHASE-1 2.Presenation	6 weeks from semester start date
2	C2	25	1. MID-TERM report/PHASE-2 2. Presenation	6 weeks from C1
3	C3	20 marks for Viva 30 marks for Thesis Total 50	1. Internship 2. Final Report 3.Final Presentation	Two weeks from C2

Evaluation of Global Certification Program

Sl.No	EXAM	MAX.MARKS	Documents To Be Submitted	Tentative Scheduling
1	C1	25	1. PHASE-1 Report on their topic of Certification. 2.Presentation.	6 weeks from semester start date
2	C2	25	1. MID-TERM report/ PHASE-2 on Their Topic of Certification. 2.Presenation	6 weeks from C1

3	C3	20 marks for Viva 30 marks for Thesis Total 50	1. Final Report 2. Final Presentation 3. Global Certificate.	Two weeks from C2

List of Open Elective Courses offered by the School of Computing and IT

a. Data Structures Using C
b. Internet Computing and Applications
c. Linux Operating Systems

Semester-Wise Soft-core Groups													
Semester	Soft core Group	Data Engineering		System Architecture and Design		Robotics and Computer Vision		Communication &Networking		Programming		Others	
		Code	Subject	Code	Subject	Code	Subject	Code	Subject	Code	Subject	Code	Subject
V	SC-1 (3)			BTCS 15F5510	Electronic System Design (3:0:0)	BTCS15F5520	Signals and Systems (3:0:0)	BTCS15F5530	Digital Communication (3:0:0)	BTCS15F5540	ProgrammingLanguages and Compiler (3:0:0)	BTCS15F5550	Object Oriented Modeling and Design (3:0:0)
VI	SC-2 (4)	BTCS 15F6410	Data Mining Techniques (3:1:0)	BTCS 15F6420	Embedded Systems &Internet of Things (3:0:1)	BTCS15F6430	Digital Image Processing (3:1:0)	BTCS15F6440	Distributed Computing Systems (3:1:0)	BTCS15F6450	Unix System Programming (3:0:1)	BTCS15F6460	Research Methodology in IT (2:1:1)
	SC-3 (4)	BTCS 15F6510	Intelligent Agents (3:1:0)	BTCS 15F6520	Multicore Architecture and Programming (3:0:1)	BTCS15F6530	Soft Computing (3:1:0)	BTCS15F6540	Advanced Computer Networks(3:1:0)	BTCS15F6550	Programming with Java (3:0:1)		
VII	SC-4	BTCS 17F7310	Big Data and Hadoop (3:0:1)	BTCS15F7320(3:0:1)	High Performance Computing	BTCS15F7330	Pattern Recognition (3:1:0)	BTCS15F7340	Network Management Systems (3:1:0)	BTCS17F7350	Network Programming (3:0:1)		
	SC-5	BTCS 15F7410	Advance d Database Management System (3:1:0)	BTCS 15F7420	VLSI Design &algorithms (3:1:0)			BTCS15F7430	Multimedia Computing &Network s (3:1:0)	BTCS15F7440	Web Technology (3:0:1)	BTCS17F7450	Computer Graphics and Visualization (3:0:1)
	SC-6					BTCS15F7510	Human Computer Interaction (3:1:0)	BTCS15F7520	Wireless and Mobile Networks(3:1:0)	BTCS15F7530	Programmingwith Python (3:0:1)	BTCS15F7540	Cloud Security (3:1:0)

VIII	**SC-7**	BTCS 15F8 110	Storage Area Networks (3:1:0)	BTCS 15F8120	Software Architecture (3:1:0)	BTCS15F8130	Real Time Systems (3:1:0)	BTCS15 F8140	Mobile Computing and Application Development (3:0:1)	BTCS15F8150	User interface Design and Development (3:0:1)	BTCS15 F8160	Optimization Techniques & Game Theory(3: 1:0)
	SC-8	BTCS 15F8210	Data Analytics Tools(3: 0:1)	BTCS 15F8220	System Modeling and Simulation (3:1:0)	BTCS15F8230	Multimedia Systems (3:1:0)	BTCS15F8240	Software Defined Networks and Network Virtualization (3:1:0)	BTCS15F8250	C# and. Net (3:0:1)		

Mapping of Course Outcomes with programme Outcomes

(Notations: L=Low or 1, M=Medium or 2, H=High or 3)

Course Code	POS/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO 7	PO8	P O9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PS O3
BTEM15F1100	CO1	H	H	H	M	H	L	-	-	-	-	-	-	H	-	M
	CO2	H	H	H	M	M	L	-	-	-	-	-	-	-	-	M
	CO3	H	H	M	M	M	M	-	-	-	-	-	-	-	-	M
	CO4	H	M	M	M	M	L	-	-	-	-	-	-	H	-	-
BTEP15F1200	CO1	H	H	H	-	-	-	-	L	L	-		M	M	-	
	CO2	H	H	M	-	-	-	-	-	L	L		M	M	-	
	CO3	H	M	-	H	-	-	-	-	-	L		M	M	H	-
	CO4	H	M	M	H	-	-	-	-	-	L	M	M	M	H	-
BTCV15F1300	CO1	H	H	M	L	H	L		-	-	-	L	H	M	-	-
	CO2	H	H	H	L	L	-		-	-	-	L	M	M		H
	CO3	H	H	M	L	L	L		-	-	-	L	M	M		H
	CO4	H	H	L	L	M	L		-	-	-	L	H	M	-	-
BTME15F1400	CO1	H	H	M	L	-	-	-	-	-	-	-	-	-	-	-
	CO2	H	H	H	M	-	-	-	-	-	-	-	-	-	-	-
	CO3	H	M	L	H	-	-	-	-	-	-	-	-	-	-	-
	CO4	H	M	L	H	-	-	-	-	-	-	-	-	-	-	-
BTEE15F1500	CO1	M	L	H	L	M	H	-	-	-	-	-	-	-	-	-
	CO2	L	H	M	M	H	-	-	-	-	-	-	-	-	-	-
	CO3	M	M	M	M	L	-	-	-	-	M	-	-	H	-	-
	CO4	H	H	H	H	L	-	-	-	-	-	-	-	-	-	-
BTIC15F1600	CO1	M	L	H	L	-	H	M	H	H	-	M	L	H	L	-
	CO2	L	H	M	M	-	H	M	H	H	-	M	H	M	M	-
	CO3	M	M	M	M	-	H	M	H	L	-	M	M	M	M	-
	CO4	H	H	H	H	-	H	M	H	L	-	M	H	H	H	-
BTCE15F1700	CO1	H	-	H	H	H	H	H	H	H	L	L	M	H	H	H
	CO2	H	-	H	H	H	H	H	H	H	L	L	M	H	H	H
	CO3	H	-	H	H	H	H	H	H	H	L	L	M	H	H	H
	CO4	H	-	H	H	H	H	H	H	H	L	L	M	H	H	H
BTPL15F1800	CO1	M	M	-	-	-	M	-	-	H	H	M	M	-	H	-
	CO2	M	M	-	-	-	M	-	-	H	H	M	M	-	H	-
	CO3	M	M	-	-	-	M	-	-	M	M	M	M	-	H	-
	CO4	M	M	-	-	-	M	-	-	M	M	M	M	-	H	-
BTEW15F1900	CO1	H	-	L	M	-	-	-	-	H	-	-	-	-	-	-
	CO2	M	L	-	M	-	-	-	-	-	-	-	-	-	-	-
	CO3	L	M	M	-	-	-	-	-	-	-	H	-	H	-	-
	CO4	-	M	M	L	-	-	-	-	-	-	-	-	-		-
BTEM15F2100	CO1	H	H	H	H	-	-	-	-	-	-	-	-	H	H	H
	CO2	H	H	M	H	-	-	-	-	-	-	-	-	H	-	-
	CO3	H	H	M	H	-	-	-	-	-	-	-	-	H	-	-
	CO4	H	H	M	H	-	-	-	-	-	-	-	-		-	-
BTEC15F2200	CO1	M	L	L	-	-	-	-	-	-	-	-	-	-	-	-
	CO2	M	L	H	M	M	M	M	-	-	-	-	-	-	-	-
	CO3	M	M	H	H	L	M	L	-	-	-	-	-	-	-	-
	CO4	H	H	M	M	M	L	M	-	-	-	-	-	H	-	-
BTEC15F2300	CO1	H	M	L	-	M	-	-	-	-	-	-	-	H	M	H
	CO2	H	H	M	-	M	-	-	-	-	-	-	-	H	H	H
	CO3	H	M	H	L	M	-	-	-	L	L	-	-	H	M	H
	CO4	H	H	H		M	-	-	-	L	L	-	-	H	H	H
BTCC15F2400	CO1	H	H	H	M	M	-	-	-	-	-	-	H	H	H	H
	CO2	H	M	H	H	M	-	-	-	-	-	-	H	H	H	H
	CO3	H	M	H	H	M	-	-	-	-	-	-	H	H	H	H
	CO4	H	H	H	H	M	-	-	-	-	-	-	H	H	H	H
BTES15F2500	CO1	H	H	H	H	H	H	H	M		M		M	H	H	-
	CO2	H	M	H	H	M	H	H		H		H		H	H	-

	CO3	H	M	H	H	M	H	M	M	M		M	M	H	M	-
	CO4	H	H	H	H	H	H	H		H	M	H		H	H	-
BTCC15F2600	CO1	-	-	-	-	-	-	-	H	L	H	L	H	H	H	-
	CO2	-	-	-	-	-	-	-	H	L	H	L	H	H	H	-
	CO3	-	-	-	-	-	-	-	H	L	H	L	H	H	H	-
	CO4	-	-	-	-	-	-	-	H	L	H	L	H	H	H	-
BTED15F2700	CO1	H	M	M	L	H	-	-	-	-	-	-	-	-	-	-
	CO2	H	L	L	L	H	-	-	-	-	-	-	-	-	-	-
	CO3	H	H	H	M	H	-	-	-	-	-	-	-	-	-	-
	CO4	H	H	H	H	H	-	-	-	-	-	-	-	-	-	-
BTCL15F2800	CO1	H	H	L	L	-	M	-	-	H	H	-	-	H	-	-
	CO2	H	H	L	-	-	M	M	-	H	H	-	-	H	-	-
	CO3	H	H	-	-	-	M	M	-	H	H	-	-	H	-	-
	CO4	H	H	L	-	-	L	L	-	H	H	-	-	H	-	-
BTCP15F2900	CO1	H	M	M	-	M	-	-	-	-	-	-	-	H	-	-
	CO2	H	H	M	M	M	-	-	-	-	-	-	-	H	H	H
	CO3	H	H	M	M	M	-	-	-	H	H	-	-	H	H	-
	CO4	H	M	L	L	-	-	-	-	H	H	-	-	H	H	H
BTCS15F3100	CO1	H	H	M	M	H	H	-	-	-	-	-	-	-	H	-
	CO2	H	H	H	H	H	H	-	-	-	-	-	-	-	-	H
	CO3	H	H	M	M	H	H	-	-	-	-	-	-	H	-	-
	CO4	M	H	M	H	H	H	-	-	-	-	-	-	H	-	-
BTCS15F3200	CO1	H	H	M	H	H	-	-	H	H	H	-	H	H	H	H
	CO2	H	H	H	H	H	-	-	H	H	H	-	H	H	H	H
	CO3	H	L	M	H	L	-	-	H	H	H	-	H	H	H	H
	CO4	H	L	H	H	M	-	-	H	H	H	-	H	H	H	H
BTCS15F3300	CO1	H	H	M	M	-	-	-	H	H	H	-	-	-	H	-
	CO2	H	H	M	M	-	-	-	H	H	H	-	-	H	-	-
	CO3	H	L	H	M	-	-	-	H	H	H	-	H	-	H	-
	CO4	H	M	M	M	-	-	-	H	H	H	-	H	-	-	-
BTCS15F3400	CO1	H	H	H	H	M	-	-	-	-	-	-	-	H	H	-
	CO2	H	M	H	M	H	-	-	H	H	H	-	H	-	-	H
	CO3	H	M	H	H	M	-	-	H	H	H	-	-	-	-	H
	CO4	H	H	H	M	L	-	-	-	-	-	-	-	H	H	-
BTCS15F3500	CO1	H	H	H	H	M	-	-	-	-	-	-	-	H	H	-
	CO2	H	M	H	M	H	-	-	H	H	H	-	H	-	-	H
	CO3	H	M	H	H	M	-	-	H	H	H	-	-	-	-	H
	CO4	H	H	H	M	L	-	-	-	-	-	-	-	H	H	-
BTCS15F3600	CO1	H	H	H	M	M	L	L	-	-	-	-	-	-	--	H
	CO2	H	H	H	M	M	L	H	-	-	-	-	-	H	H	H
	CO3	H	H	M	H	M	H	L	-	-	-	-	-	H	H	-
	CO4	H	H	M	M	H	H	L	-	-	-	-	-	-	-	-
BTCS15F3700	CO1	M	H	H	L	M	L	M	H	H	L	-	-	H	-	H
	CO2	H	H	M	H	H	H	H	H	M	H	-	-	H	-	-
	CO3	H	M	M	M	L	M	L	M	M	M	-	H	-	H	-
	CO4	H	H	M	H	H	H	H	H	M	H	-	H	-	H	-
BTCS15F3800	CO1	H	M	H	-	-	-	-	-	-	-	-	-	-	H	H
	CO2	H	H	-	-	H	-	-	-	H	-	-	-	-	-	-
	CO3	H	M	-	-	H	-	-	-	-	-	-	-	H	-	H
	CO4	H	H	-	-	-	-	-	-	H	-	-	-	-	H	-
BTCS15F4100	CO1	H	L	H	H	M	L	L	-	-	-	-	-	H	-	-
	CO2	H	H	M	M	M	L	H	-	-	-	-	-	H	-	-
	CO3	H	H	H	M	M	H	L	-	-	-	-	-	-	-	H
	CO4	M	M	M	M	H	M	L	-	-	-	-	-	H	H	H
BTCS15F4200	CO1	H	H	H	M	M	L	L	-	-	-	-	H	-	-	-
	CO2	H	H	H	M	H	L	H	-	-	-	-	H	H	-	-
	CO3	H	H	H	H	M	H	L	-	-	-	-	-	H	-	-
	CO4	H	H	H	M	H	H	L	-	-	-	-	-	-	H	-
BTCS15F4300	CO1	H	M	H	H	H	-	-	-	-	-	-		L	H	L
	CO2	M	H	L	M	M	-	-	-	-	-	-		H	H	H

	CO4	H	-	M	-	M	-	-	-	-	-	-	-	H	H	-
BTCS15F7530	CO1	H	H	M	-	H	-	-	-	-	-	-	-	H	H	H
	CO2	H	H	H	-	H	-	-	-	-	-	-	-	H	H	H
	CO3	H	H	M	-	H	-	-	H	-	H	-	H	H	H	H
	CO4	H	H	M	H	H	-	-	-	H	-	-	-	H	H	H
	CO5	H	H	M	-	H	-	-	-	-	-	-	-	H	H	H
BTCS15F7540	CO1	H	-	-	-	-	-	-	-	-	-	-	-	H	H	-
	CO2	H	-	-	-	-	-	-	-	-	-	-	-	H	H	-
	CO3	H	-	-	-	-	-	-	-	-	-	-	-	H	H	-
	CO4	H	-	M	-	-	-	-	-	-	-	-	-	H	H	-
BTCS15F7600	CO1	H	H	M	L	H	-	-	-	-	-	-	-	H	H	-
	CO2	H	H	M	H	H	-	-	-	-	-	-	-	H	H	-
	CO3	H	H	H	L	H	-	-	-	-	-	-	-	H	H	-
	CO4	H	H	M	L	H	-	-	-	-	-	-	-	H	H	-
BTCS15F7700	CO1	H	H	M	L	H	-	-	-	-	-	-	-	H	H	H
	CO2	H	H	M	H	H	-	-	-	-	-	-	-	H	H	H
	CO3	H	H	H	L	H	-	-	-	-	-	-	H	H	H	H
	CO4	H	H	M	L	H	-	-	-	-	-	-	-	H	H	H
BTCS15F8110	CO1	H	H	-	H	-	-	-	-	-	H	-	-	H	H	-
	CO2	H	-	-	-	-	-	-	H	-	-	-	H	H	H	-
	CO3	H	-	-	-	-	-	-	-	-	-	-	-	H	H	-
	CO4	H	-	-	-	-	-	-	-	H	-	-	-	H	H	H
BTCS15F8120	CO1	H	-	L	-	-	-	-	-	-	-	-	-	H	H	-
	CO2	H	-	-	-	-	-	-	-	-	-	-	-	H	H	-
	CO3	H	-	-	-	-	-	-	-	-	-	-	-	H	H	-
	CO4	H	-	L	-	-	-	-	-	-	-	-	-	H	H	-
	CO5	H	-	M	-	-	-	-	-	-	-	-	-	H	H	-
	CO6	H	-	M	-	-	-	-	-	-	-	-	-	H	H	-
BTCS15F8130	CO1	H	-	-	-	-	-	-	-	-	-	-	-	H	H	-
	CO2	H	M	-	-	-	-	-	-	-	-	-	-	H	H	-
	CO3	H	-	M	-	-	-	-	-	-	-	-	-	H	H	-
	CO4	H	-	M	-	-	-	-	-	-	-	-	-	H	H	-
BTCS15F8140	CO1		H	-	-	-	-	-	-	-	-	-	-	H	H	-
	CO2		H	H	-	H	-	-	-	-	-	H	-	H	H	H
	CO3		H	H	-	H	-	-	-	-	-	-	H	H	H	H
	CO4		H	H	-	H	-	-	-	-	H	-	-	H	H	H
BTCS15F8140	CO1	-	-	-	-	-	-	-	-	-	-	-	H	H	H	-
	CO2	-	H	H	-	H	-	-	-	-	-	H	-	H	H	-
	CO3	-	-	L	-	-	-	-	-	-	H	-	-	H	H	-
	CO4	-	-	H	-	-	-	-	-	-	-	-	-	H	H	-
BTCS15F8160	CO1	H	M	L	-	-	-	-	-	-	-	-	-	H	H	-
	CO2	H	M	L	-	-	-	-	-	-	-	-	-	H	H	-
	CO3	H	M	L	-	-	-	-	-	-	-	-	-	H	H	-
	CO4	H	M	L	L	-	-	-	-	-	-	-	-	H	H	-
BTCS15F8210	CO1	H	M	-	-	H	-	-	-	-	-	-	-	H	H	H
	CO2	H	M	M	L	H	-	-	-	H	-	-	-	H	H	H
	CO3	H	H	H	H	H	-	-	H	-	-	-	-	H	H	H
	CO4	H	M	M	L	H	-	-	-	-	H	-	H	H	H	H
BTCS15F8220	CO1	H	H	M	L	L	-	-	-	-	-	-	-	H	H	-
	CO2	H	H	M	L	L	-	-	-	-	-	-	-	H	H	-
	CO3	H	H	M	L	L	-	-	-	-	-	-	-	H	H	-
	CO4	H	H	M	L	L	-	-	-	-	-	-	-	H	H	-
BTCS15F8230	CO1	H	-	-	-	-	-	-	-	-	-	-	-	H	H	-
	CO2	H	L	-	-	-	-	-	-	-	-	-	-	H	H	-
	CO3	H	L	-	-	-	-	-	-	-	-	-	-	H	H	-
	CO4	H	L	-	-	-	-	-	-	-	-	-	-	H	H	-
BTCS15F8240	CO1	H	-	-	-	-	-	-	-	-	L	-	L	H	H	-
	CO2	H	-	-	-	-	-	-	-	-	-	-	L	H	H	-
	CO3	H	-	L	-	-	-	-	-	-	-	-	L	H	H	-
	CO4	H	-	L	-	-	-	-	-	-	L	L	L	H	H	-
BTCS15F8250	CO1	H	H	M	-	H	H	-	-	-	-	-	-	H	H	H

	CO2	H	H	M	-	H	H	-	-	-	-	-	-	H	H	H
	CO3	H	-	H	-	H	H	-	-	-	-	-	-	H	H	H
	CO4	H	H	M	-	H	-	-	-	-	-	-	-	H	H	H

Course Code	Course Title	Duration (Week)	Course Type	L	T	P	C	Hrs/ Wk
BTCS15F7420	VLSI Design & Algorithms	16	SC	3	1	0	4	5

COURSE OBJECTIVES:

The objective of this course is to:

1. Introduce the working principle of MOS transistor and CMOS technology.
2. Describe the concepts of physical design and design rules of MOS.
3. Discuss Graph algorithms for physical design.
4. Outline the chip input output devices.
5. Provide introduction to toll development and insight to CAD algorithms.

COURSE OUTCOMES:

On successful completion of this course, the student shall be able to:

1. Explain the working principle of MOS transistor and MOS inverters.
2. Define all the definitions associated with MOS inverters.
3. Employ graph algorithms for physical design.
4. Develop tools for CAD-VLSI.

CO PO & PSO MAPPING:

CO#/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	1	-	-	-	-	-	-	-	-	-	3	3	-
CO2	3	-	1	-	-	-	-	-	-	-	-	-	3	3	-
CO3	3	-	1	-	-	-	-	-	-	-	-	-	3	3	-
CO4	3	-	1	-	3	-	-	-	-	-	-	-	3	3	3

Note:1-Low,2-Medium,3-High

COURSE CONTENTS:

Unit -I:

BASIC MOS TECHNOLOGY

Integratedcircuit'sera, Enhancement and depletion mode MOS transistors.Nmos fabrication.CMOS fabrication. Introduction to BiCMOS technology. Production of E-beammasks.

Unit -II:

MOS TRANSISTOR THEORY:

Introduction, MOS Device Design Equations(Drain current equations), The Complementary CMOS Inverter – DC Characteristics, Static Load MOS Inverters, Pass transistors and Transmission Gate, TristateInverter.

Unit- III:

Graph algorithms for physical design:

Classes of graphs, graph related to a set of lines, graph related to a set of rectangles, graph problems in physical design, maximum clique and minimum colouring, max k- independent set algorithm, algorithms for circle graphs

Unit -IV:

Partitioning algorithms:

Design style specific partitioning problems, group migrated algorithms, simulated annealing and evolution, floor planning and pin assignment, routing and placement algorithms.

RECOMMENDED LEARNING RESOURCES:

1. DouglasA.Pucknell & Kamran Eshraghian,Basic VLSI Design-,PHI 3rd Edition(original Edition – 1994),2005.
2. Neil H. E. Weste, K. Eshragian Principles of CMOS VLSI Design: A Systems Perspective, 3rd edition, PearsonEducation
3. John wiley& sons, chichester, Algorithms for VLSI design automation 4.Sherwani, Naveed A,Algorithms for VLSI physical design automation

REFERENCES:

1. R.Jacob Baker. CMOS Circuit Design, Layout and Simulation.John Wiley IndiaPvt.Ltd,2008
2. Fundamentals of Semiconductor Devices, M. K. Achuthan and K.N. Bhat, Tata McGraw-Hill Publishing Company Limited, New Delhi,2007.
3. CMOS Digital Integrated Circuits: Analysis and Design, Sung-MoKang & Yusuf Leblebici,3rdEdition, Tata McGraw-Hill Publishing Company Ltd., New Delhi,2007.
4. Analysis and Design of Digital Integrated Circuits - D.A Hodges,H.G Jackson and R.A Saleh. 3rd Edition, Tata McGraw-Hill Publishing Company Limited, New Delhi,2007.
5. Hand book of algorithms for physical design automation - Charles J. Alpert, Dinesh P. Mehta, Sachin S. Sapatnekar, CRC press 2008.

REVA UNIVERSITY
Bengaluru, India

Proceedings of the meeting of Board of Studies in the Electrical and Electronics Engineering held on 9th June 2018 in Conference Room, 1st Floor, Administrative Block, REVA University, Rukmini Knowledge Park, Yelahanka, Bangalore – 560 064.

Member Present:

Sl. No.	Name of the Member	Designation	Affiliation
1	Dr. Rajashekar P Mandi	Chairperson	Director, School of EEE, REVA University, Bangalore
2	Dr. Divakar B.P	Member	Dean (R&I), REVA University, Bangalore
3	Dr. Narendranath Udupa	Member	Director, Philips, Bangalore
4	Mr. Nagaraj Hediyal	Member	CEO, eNLiven Technologies, R&D centre & Design Consultants, Bangalore
5	Mr. Paramesh K.	Member	Dy. Director, KERC, Bangalore
6	Mr. Nagadev Singh	Member	Manager, EFD-Furnace Pvt. Ltd., Bangalore
7	Mr. K. Narayana Swamy,	Member	Associate Professor, School of EEE, REVA University, Bangalore
8	Mr. G. Raghavendra	Member	Assistant Professor, School of EEE, REVA University, Bangalore
9	Mr. Raghu C.N.	Member	Assistant Professor, School of EEE, REVA University, Bangalore
10	Dr. Harish Babu	Member	Professor, Dept. of Mathematics, REVA University, Bangalore
11	Mr. Sagar B S	Member	Assistant Professor, School of EEE, REVA University, Bangalore

Member Absent:

Sl. No.	Name of the Member	Designation	Affiliation
1	Dr. Ravishankar Deekshith	Member	Professor and HOD, BMSCE, Bangalore
2	Dr. C.S. Sharma		Director CEPO, Indian Space Research Organization (ISRO), Anthariksh Bhavan, New BEL Road, Bangalore

(5) BDS - BTECH EEE, MTECH-PE, MTECH-DS, MTECH-RO - 2018

Proceedings

Dr. Rajashekar P Mandi, Chairperson of the Board of Studies in Electrical & Electronics Engineering welcomed all the BOS members present for the meeting and thanked them for sparing their valuable time and briefed about the outline of the meeting and requested all the members to deliberate on the agenda, and then the Agenda were taken up for discussion.

Agenda:

1) Swapping of one soft core course from/to 5th & 6th Sem for B Tech Batch 2016-20 & Batch 2017-21 and replacing of one of the softcore courses for B Tech batch 2015-19
2) Setting of New syllabus for B Tech. for 2018-22 batch.
3) Change of nomenclature of M Tech programme title from "Advanced Power Electronics" to "Power Electronics".
4) Revision of syllabus for M Tech in Power Electronics for Batch 2018-20
5) Setting of Syllabus for new M Tech programme in Power & Energy Systems for full time for Batch 2018-20.
6) Setting of Syllabus for new M Tech programme in Power & Energy Systems for part time for Batch 2018-20.
7) Syllabus for PhD course 2 for two research scholars who joined for PhD during the year 2018.

Agenda topic BOS.AG1. Swapping of one softcore course from/to 5th & 6th Sem for BTech. Batch 2016-20 & Batch 2017-21

Discussion: The chair informed that the course Programming in Java (BTEE155604) included in the 5th semester for BTech at present requires knowledge of Data Structure using C++ which is included in the 6th semester. Hence requested members to consider swapping of the two courses for better integration of the two courses. The course Programming in Java (BTEE155604) is there in 2nd softcore group (SG) and in 6th semester Data structure using C++ course is there in 3rd softcore group. It is decided to shift the 5th sem softcore course "Programming in Java (BTEE155604)" to 6th semester and shift the 6th sem softcore course "Data Structure using C++ (BTEE156504)" to 5th semester. Fuzzy logic system Course is replaced by Database Management System in 7th sem for Batch 2015-19.

Resolution: The Board unanimously agreed to swap the softcore courses from/to 5th semester and 6th semester.

Present:

5th Semester softcore course: Programming in Java (BTEE155604) and 6th semester softcore course: Data Structure using C++ (BTEE156504)

To be changed to:

5th Semester softcore course: Data Structure using C++ (BTEE185604) and 6th semester softcore course: Programming in Java (BTEE186504).

Agenda topic BOS.AG2. BTech. New syllabus for BTech. for 2018-22 batch

Discussion:

- The members deliberated on the distribution of credits for the new syllabus for BTech commencing in 2018. The chair briefed the members about the division of total credits into mandatory credits of 176 and additional credits of 16. While the various hardcore and softcore courses fall into the mandatory type the credits earned in yoga/sports/performing arts/ SWAYAM/MOOC/ skill development all put together fall into the second category of 16 credits.

- The members were briefed about the slight changes in the 1st semester. The Elements of Civil Engineering course is replaced with Engineering Mechanics course. It was deeply discussed that in many of the hardcore and softcore courses, some part of the basics is also covered, therefore, Basic Electrical Engineering (of 1st sem) and Basic Electronics Engineering (of 2nd sem) courses are merged into a single course as Basic Electrical & Electronics Engineering and is introduced in 1st sem. No changes in the remaining courses and labs, the total credits stand are 23.

- The changes in the 2nd semester were mentioned to the members. The Electrical Power Generation & Transmission course is brought in from 3rd semester to 2nd semester which require a pre-requisite of only basic electrical engineering which is covered in 1st sem. One of the members suggested that Bridge course must be taken for EEIM and EPG courses if other branch students are coming to electrical school with change of branch for 3rd sem. The chairperson appreciated the suggestion given by the member and assured that the bridge course for EPG will be taken during 3rd sem and EEIM will be taken up during 4th sem. The committee members had the opinion on removing of Computer Aided Engineering Drawing (CAED) in 2nd sem which deals with only basics of engineering drawing and is being handled by Mechanical School. The EEE students study Engineering electrical drawing in 7th sem in details along with basics of engineering drawing, detailed drawing of electrical machines and machine design. The Electrical & Electronic Instrumentation and Measurements is brought in from 3rd semester to 2nd semester which require a pre-requisite of only basic electrical engineering which is covered in 1st sem. The total credits allocated in 2nd sem are 23 credits.

- In 3rd semester, 6 hardcore courses and two labs are allocated. The Electrical circuit theory 1 and Electrical circuit theory 2 are merged into one course of Electrical circuit theory (ECT). The committee members are have suggested that Analog electronic circuit design (AECD) and digital electronic circuit design (DECD) can be merged into one course with Analog electronic and digital electronic circuit design to accommodate additional hardcore courses. Theory and Applications of Linear Integrated Circuits (LIC) is brought in from 6th semester to 3rd semester. Committee members suggested that LIC is also an important course which needs to be studied by EEE students. Analog electronic circuit design lab and digital electronic circuit design lab are merged and made as one lab. Electrical and Electronics Measurements Lab is brought in from 4th semester to 3rd semester. One skill development program and one soft skill are introduced with 2 credits each (additional credits). The courses Electrical Machines I and Microcontrollers and Applications and are brought in from 4th semester to 3rd semester. The total credits allocated (including mandatory & additional) in 3rd sem are 27 credits.

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- In 4th semester, 4 hardcore courses (12 credits), 2 softcore courses (6 credits), 2 labs (4 credits) and soft skill of 2 credits are allocated along with sports/yoga/performing arts of 2 credits and SWAYAM/MOOC courses of 3 credits. Two softcore groups are introduced with each softcore group consisting of four courses each. In softcore group 1, Electrical power utilization, Electric drives, Digital System design with VHDL and Data base management system are introduced for the students to opt any one course from this group of their choice depending on their specialization. Similarly in softcore group 2, Management & Entrepreneurship, Electricity Act, Programmable logic controller and Data structure using C++ are introduced. Electrical Machine lab 1 is retained and microcontroller lab is brought in from 5th sem to 4th sem. The course Electrical Machines II is brought in from 5th semester to 4th semester. SWAYAM/MOOC course for 3 credits online course and Yoga/Sports/Performing Arts/Meditation for 2 credits course are introduced as additional credits. The total credits allocated (including mandatory & additional) in 4th sem are 29 credits.

- In 5th semester, 3 hardcore courses (9 credits), 3 softcore courses (9 credits), 2 labs (4 credits) and soft skill of 2 credits are allocated.Power System Analysis, Switch Gear & Protection (SGP) & High Voltage Engineering courses are introduced as hardcore courses. Initially the SGP course was planned as softcore but one of the BOS members suggested to make SGP as hardcore course because this course is very essential for an electrical engineer. Therefore, SGP course is made as hardcore which is a compulsory. Three softcore groups are introduced with each softcore group consists of four courses. In softcore group 1, Design of Electrical Machines, Advanced Power Electronics, VLSI Circuits and Design & Python Programming are introduced for the students to opt any one course from this group of their choice depending on their specialization. Similarly in softcore group 2, Operation & Research, Electric & Hybrid Vehicles, Digital Image Processing & Web Programming are introduced. Similarly in softcore group 3, Electrical Power Quality, Electrical regulations and safety, Embedded Systems & IOT and Artificial Intelligence are introduced. Power electronic lab is moved in from 4th semester to 5th semester and Electrical Machine lab 2 is brought in from 6th sem to 5th sem. One Skill Development Program is introduced with 2 credits (additional credits). The total credits allocated (including mandatory & additional) in 5th sem are 26 credits.

- In 6th semester, 3 hardcore courses (9 credits), 3 softcore courses (9 credits), 2 labs (4 credits) and soft skill of 2 credits are allocated along with skill development program of 2 credits and SWAYAM/MOOC courses of 3 credits. Computer Aided Power System Analysis and Stability, Digital Signal Processing (DSP) & Control Engineering courses are introduced as hardcore courses. DSP course is made as hardcore course to enhance the skill of students in signal processing and signal processing lab (in 7th sem) is also introduced. Three softcore groups are introduced with each softcore group consists of five courses. In softcore group 1, Testing and Commissioning of Electrical Equipment, Energy storage systems, Electrical Engineering Materials, MEMS Technology and Big Data Analytics & Cloud Computing are introduced for the students to opt any one course from this group of their choice depending on their specialization. Similarly in softcore group 2, Power System Planning and Reliability, Modeling and Simulation of Electrical Machines, Industrial Instrumentation and Automation, Fundamentals of Robotics and JAVA Programming are introduced. Similarly in softcore group 3, Smart grid, Reactive power management, Advanced Electrical Machines, Analog & Digital Communication Systems and Cryptography & Network Security are introduced. Power system simulation lab is shifted from 7th sem to 6th sem and Control system lab 2 is retained. SWAYAM/MOOC course for 3 credits online course and one skill development Program of 2 credits course are introduced as

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additional credits. The total credits allocated (including mandatory & additional) in 6th sem are 29 credits.

- In 7th sem, one hardcore course (4 credits), 2 softcore courses (6 credits), one open elective course of 3 credits and 2 labs (4 credits) are allocated along with one skill development program of 2 credits. Computer Aided Electrical Drawing is introduced as hardcore with lab component. Project phase 1 is introduced for the students to carry out the literature review, writing synopsis or to carry out a mini project during this semester. Two softcore groups are introduced with five courses for Softcore group 1 & four courses for Softcore group 2. In Softcore group 1, Advanced Control Engineering, Electrical Energy Conservation, Computer Control of Electric drives, Advanced microcontrollers & Software testing are introduced for the students to opt any one course from this group of their choice depending on their specialization. Similarly in Softcore group 2, HVDC, Operation & Control of Power Systems, Optic Fiber Communications and Computer Networks Concepts & Protocols are introduced. One open elective course is introduced for the students to opt a course of their own choice from other schools (excluding own school). This will help students to develop their skills in different fields. One of the members suggested to introduce the signal processing lab to enhance the students' skill in the area for digital signal processing capabilities using MATLAB simulation. The chairperson welcomed the suggestion by the member and informed that in this semester Signal processing lab is introduced. One skill development program of 2 credits course is introduced as additional credits. The total credits allocated (including mandatory & additional) in 7th sem are 21 credits.

- In 8th sem, major project of 8 credits, one softcore course (3 credits) and Internship / Global Certification of 3 credits are allocated. The major project need to be carried out by the students at industry and there must be a hardware development with some simulation work. The major project will be reviewed periodically by the guides at industry/faculty and regular evaluation of IA1, IA2 & IA3 will be carried out for major project. One softcore group is introduced with four courses i.e., Trouble Shooting of Common Electrical Equipments, Introduction to Flexible AC transmission system, Wireless communication & Machine Learning Techniques are introduced for the students to opt any one courses from this group of their choice depending on their specialization. The total credits allocated (including mandatory & additional) in 8th sem are 14 credits.

- All the board members have discussed in depth and praised that the syllabus is framed to suit the present day industrial applications.

Resolution: The Board unanimously agreed to adopt the new scheme and syllabus for BTech in Electrical & Electronics Engineering for 2018-22 Batch onwards.

Agenda topic BOS.AG3. M Tech Changing the name of the M Tech course title from "Advanced Power Electronics" into "Power Electronics".

Discussion: Since the admission to M Tech course has dwindled during past three years for unknown reasons, the course title is renamed as only MTech. in "Power Electronics" to attract more students to M Tech program in Power Electronics

Resolution: The board unanimously resolved to adopt the new name for the M Tech course as M Tech in "Power Electronics" instead of Advanced Power Electronics.

Agenda topic BOS.AG4. M Tech: Revision of syllabus for M Tech in Power Electronics for Batch 2018-20

Discussion:

- The total number credits are retained with 96 credits.

- In 1st sem, four courses are hardcore (18 credits) and two courses are softcore (8 credits). Applied Mathematics, Analysis of Power Converters and Power semiconductor Devices and design issues courses are retained as hardcore courses. Advanced Electrical Machines course is changed from Softcore to hardcore to deal with advanced electrical machines for electric vehicles and other applications. Two softcore groups are introduced with each softcore group of four courses each. In softcore group 1, Computer Aided Power System Operation and Analysis (new course added), Power system Instrumentation (course retained), SCADA & PLC System and Application (new course added) and Wind energy System (new course added) are incorporated. In softcore group 2, FACTS Controller (course retained), Dynamics of linear systems (course retained), Grid Integration to Renewable Energy System (new course added) and Reactive Power Management (new course added) are incorporated. The total credits allocated in 1st sem are 26 credits.

- In 2nd sem, three courses are hardcore (14 credits) and three courses are softcore (12 credits). Analysis of power Conversion using DC-DC converters and HVDC Transmission hardcore courses are retained. AC-DC Drives course is changed from Softcore to hardcore course. Three softcore groups are introduced with four courses for SG1 & SG2 and five courses for SG3. In softcore group 1, Electric vehicle (course retained), Recent Trends in Grid Technology like Microgrid and Smart Grid (new course added), Environmental Impacts of Energy Conversion and Safety (new course added) and FPGA Application (new course added) are incorporated. One of the members suggested that the power electronic design component may be incorporated in one of the course. The chairperson welcomed the suggestion and informed to the committee members that to consider the design component in the hardcore subjects like Analysis of power converter and power semiconductor devices, the lab components are added and also senior faculties like Dr. Divakar B.P. & Prof. Narayana Swamy are taking up of additional tutorial and lab hours to enhance the skill of students in design aspect of power electronics. In softcore group 2, Power Quality and Harmonics Mitigation (course retained with change in title and slight modification in syllabus by adding few topics on harmonic filter design & application), Fuzzy logic system (course retained), Electricity Regulations (new course added) and Reliability Engineering (new course added) are incorporated. In softcore group 3, Multilevel Inverter (course retained), EMC / EMI / Power transients (course retained with modification in title and syllabus), Optimization Techniques (new course added), Grid Integration to Renewable Energy System (new course added) and Trouble shooting & Maintenance of Electrical equipment (new course added) are incorporated. Some of the members have suggested to discuss the case studies for subjects like Fuzzy logic system, FPGA Application, Power quality, etc. The chairperson accepted the suggestion given by the committee and informed the committee members that while framing the syllabus, the care was taken to incorporate the practical aspects for the courses. However, the chairperson had appreciated the committee

members for the suggestions which will be implemented. The total credits allocated in 2nd sem are 26 credits.

- In 3rd sem, one softcore course of 4 credits, one open elective course of 4 credits, Skill development program / certification program of 4 credits, Mini project / Internship of 8 credits, MOOC/SWAYAM course with 2 credits and Yoga / sports / performing arts with 2 credits are incorporated. In softcore group there are four courses i.e., Application of ICs in the design of Power Electronic Circuits (course retained), Energy Conservation and Auditing (new course added), Power Economics and Trading (new course added) and Project Management & Report writing (new course added) are incorporated while Simulation of Power Electronic circuits is deleted because many of the concepts & topics are repeated.The total credits allocated in 3rd sem are 24 credits.

- In 4th sem, major project is retained as compared to earlier Scheme (207-19) with 20 credits. The major project need to be carried out by the students at industry and there must a hardware development with some simulation work. The major project will be reviewed periodically by the guides at industry/faculty and regular evaluation of IA1, IA2 & IA3 will be carried out for major project.

Resolution: The Board unanimously agreed to adopt the new scheme and syllabus for M Tech in Power Electronics for 2018-22 Batch onwards.

Agenda topic BOS.AG5. M Tech. Syllabus for new M Tech program in Power & Energy Systems (full time) for Batch 2018-20

Discussion:

- The total number credits are 96 credits.

- In 1st sem, four courses are hardcore (18 credits) and two courses are softcore (8 credits). Applied Mathematics, Computer Aided Power System Operation and Analysis, Power System Protection and Analysis of Power Converters are incorporated as hardcore courses. Two softcore groups are introduced with each softcore group consists of four courses each. In softcore group 1, Advanced Electrical Machines, Power system Instrumentation, SCADA & PLC System and Application and Energy Storage Technology are incorporated. Some of the members suggested that for SCADA, the industry visit or internship may be arranged for the students to see the actual SCADA system in field. The Chairperson had assured that the field visits are being arranged to showcase the actual practical application of SCADA system and also informed that the hands on workshop on PLC will be arranged for the students. In softcore group 2, FACTS Controller, Grid Integration to Renewable Energy System, Reactive Power Management and Recent Trends in Grid Technology (Smart Grid) are incorporated. The total credits allocated in 1st sem are 26 credits. HVDC Transmission

- In 2nd sem, three courses are hardcore (12 credits) and three courses are softcore (12 credits). Solar Energy System, Energy Conservation & Demand side Management and

[redacted] are incorporated as hardcore courses. Three softcore groups are introduced with each softcore group consists of four courses each. In softcore group 1, Electric vehicle, AC-DC Drives, A[redacted]d FPGA Application are incorporated. In softcore group 2, Power Quality and Harmonics Mitigation, EMC / EMI / Power Transients, Reliability Engineering and Wind energy System are incorporated. In softcore group 3, Multilevel Inverter, Environmental Impacts of Energy Conversion and Safety, Trouble shooting & Maintenance of equipment and Green Building Technology are incorporated. One of the members suggested for inviting external expert to give lecture and share the industry experience on energy conservation and demand side management. The chairperson had informed that the case studies are included in the syllabus, it is also made mandatory that for each course minimum two external experts from industries are being invited to deliver expert lecture & share their industrial experience. The total credits allocated in 1st sem are 24 credits.

- In 3rd sem, one softcore course of 4 credits, one open elective course of 4 credits, Skill development program / certification program of 4 credits, Mini project / Internship of 8 credits, MOOC/SWAYAM course with 2 credits and Yoga / sports / performing arts with 2 credits are incorporated. In softcore group there are four courses i.e., Electricity Regulations, Power System Dynamics & Control, Power Economics & Trading and Project Management & Report writing are incorporated.The total credits allocated in 2nd sem are 24 credits.

- In 4th sem, only major project is incorporated. The major project needs to be carried out by the students at industry and there must a hardware development with some simulation work. The major project will be reviewed periodically by the guides at industry/faculty and regular evaluation of IA1, IA2 & IA3 will be carried out for major project.

Resolution: The Board unanimously agreed to adopt the new scheme and syllabus for MTech in Power & Energy Systems (Full time) for 2018-22 Batch onwards.

Agenda topic BOS.AG6. MTech. Syllabus for new MTech program in Power & Energy Systems (part time) for Batch 2018-21

Discussion:

- The MTech in Power & Energy System (part time) is conducted in six semesters of three years duration. The total number of credits are 96 credits.

- In 1st sem, two courses are hardcore (9 credits) and one course is softcore (4 credits). Applied Mathematics and Analysis of Power Converters are incorporated as hardcore courses. One softcore group is introduced with four courses i.e., Advanced Electrical Machines, Power system Instrumentation, SCADA & PLC System and Application and Energy Storage Technology are incorporated. The total credits allocated in 1st sem are 13 credits.

- In 2nd sem, two courses are hardcore (9 credits) and one course is softcore (4 credits). Computer Aided Power System Operation and Analysis and Power System Protection are incorporated as hardcore courses. One softcore group is introduced with four courses i.e., FACTS Controller, Grid Integration to Renewable Energy System, Reactive Power Management and Recent Trends in Grid Technology (Smart Grid) are incorporated. Some of the members felt that the simulation component may be added to the courses like FACTS controller, reactive power management,

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etc. For these subjects additional hours are being allotted to provide the simulation. The total credits allocated in 2nd sem are 13 credits.

- In 3rd sem, two courses are hardcore (8 credits) and one course is softcore (4 credits). Solar Energy System and Energy Conservation & Demand side Management are incorporated as hardcore courses. One softcore group is introduced with four courses i.e., Power Quality and Harmonics Mitigation, EMC / EMI / Power Transients, Reliability Engineering and Wind energy System are incorporated. The total credits allocated in 3rd sem are 12 credits.

- In 4th sem, one course is hardcore (4 credits) and two courses are softcore (8 credits). HVDC Transmission course is incorporated as hardcore course. Two softcore groups are introduced with each softcore group consists of four courses. In softcore group 1, Electric vehicle, AC-DC Drives, Advanced Energy Systems and FPGA Application are incorporated. In softcore group 2, Multilevel Inverter, Environmental Impacts of Energy Conversion and Safety, Trouble shooting & Maintenance of equipment and Green Building Technology are incorporated.The total credits allocated in 4th sem are 12 credits.

- In 5th sem, one softcore course of 4 credits, one open elective course of 4 credits, Skill development program / certification program of 4 credits, Mini project / Internship of 8 credits, MOOC/SWAYAM course with 2 credits and Yoga / sports / performing arts with 2 credits are incorporated. In softcore group there are four courses i.e., Electricity Regulations, Power System Dynamics and Control, Power Economics & Trading and Project Management & Report writing are incorporated.The total credits allocated in 5th sem are 24 credits.

- In 6th sem, only major project is incorporated. The major project needs to be carried out by the students at industry and there must a hardware development with some simulation work. The major project will be reviewed periodically by the guides at industry/faculty and regular evaluation of IA1, IA2 & IA3 will be carried out for major project.

Resolution: The Board unanimously agreed to adopt the new scheme and syllabus for MTech in Power & Energy Systems (Part time) for 2018-22 Batch onwards

Agenda topic BOS.AG7. PhD. Syllabus for PhD course 2 for two research scholars who joined for PhD during the year 2018.

Discussion:

- During the year 2018, two research scholars have got admitted for perusing PhD at School of EEE, REVA University under the guideship of Dr. Rajashekar P. Mandi, Director and Dr. Divakar B.P., Dean (R&I) one each.

- The course 2 syllabus is framed to suit the research work of Scholars. The following course titles are selected and framed the detailed syllabus for two research Scholars:
  a) Modeling and Performance Evaluation of Three Phase Induction Motor
  b) Modeling of Induction Motor and Power Electronics Devices

Resolution: The Board unanimously agreed to adopt the syllabus for course 2 for two PhD research scholars for 2018 Batch.

The Chairperson thanked the members of the Board for their valuable inputs. The meeting was then concluded.

Director
School of Electrical &
Electronics Engineering
REVA University, Rukmini Knowledge Park
Kattigenahalli, Yelahanka, Bengaluru-560 06

REVA UNIVERSITY
Bengaluru, India

School of Electrical & Electronics Engineering

Board of Studies in Electrical & Electronics Engineering

Attendance Sheet

Date: 09-06-2018 **Time: 10:30 AM** **Venue: Board Room, Administrative Block**

Sl. No.	Name of the Member	Designation	Affiliation	Signature
1.	**Dr. Rajashekar P Mandi** Director, School of Electrical & Electronics Engineering, REVA University	Chairperson	REVA University	
2.	**Dr. Divakar B.P** Dean, Research & Innovation, REVA University	Member	REVA University	B.P Divakar
3.	**Dr. Ravishankar Deekshith** Professor and HOD, BMSCE, Bangalore	Member	BMSCE, Bangalore	
4.	**Dr. C.S. Sharma,** Director CEPO, Indian Space Research Organization (ISRO), Anthariksh Bhavan, New BEL Road, Bangalore	Member	ISRO, Bangalore	
5.	**Dr. Narendranath Udupa,** Director and Dept. Head Philips, Bangalore	Member	~~M/s. Phillips,~~ Bangalore Independent Energy Consultant	
6.	**K Nagdev Singh** Manager-Marketing-Special Applications, EFD Induction Private Limited, Bangalore	Member	M/s. EFD Induction Pvt. Ltd., Bangalore	
7.	**Mr. Paramesha K** Deputy Director (Power System) Karnataka Electricity Regulatory Commission, Bangalore	Member	KERC, Bangalore	
8.	**Mr. Nagaraj Hediyal** Chief Executive Officer, eNLiven Technologies, R&D centre & Design Consultants, Bangalore	Member	M/s. eNLiven Technologies Pvt., Ltd., Bangalore	9/6/18

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9.	**Mr. K.Narayana Swamy,** Sr. Associate Professor, REVA University	Member	REVA University	
10.	**Dr. Harish Babu** Associate Professor, Maths Dept. REVA University	Member	REVA University	
11.	**Mr. Raghavendra G.,** Asstt. Professor, School of Electrical and Electronics Engineering, REVA University	Member	REVA University	
12.	**Mr. Raghu N.** Asstt. Professor, REVA University	Member	REVA University	

Director
School of Electrical &
Electronics Engineering
REVA University, Rukmini Knowledge
Kattigenahalli, Yelahanka, Bengaluru

REVA UNIVERSITY
SCHOOL OF EEE

REVA UNIVERSITY
Bengaluru, India

List of new courses

The following courses are introduced in the curriculum for the program and batch mentioned below:
Program: B. Tech in Electrical and Electronics Engineering
Batch: 2018-2022

SL No	Course Code	Course Name
1	B18EE1030	Engineering Mechanics
2	B18EE1050	Basic Electrical & Electronics Engineering
3	B18EE2030	Electrical Power Generation & Transmission
4	B18EE2040	Computer Concepts and C++ Programming
5	B18EE2090	Computer programming (C++) Lab
6	B18EE3040	Analog Electronic and Digital Electronic Circuit Design
7	B18EE3070	Analog Electronics & Digital Circuit Design Laboratory
8	B18EE3090	Soft Skill
9	B18EE3X10	SKILL DEVELOPMENT
10	B18EE4090	Soft Skill
11	B18EEX10	MOOC / SWAYAM
12	B18EE4X20	YOGA FOR HEALTH
13	B18EE4X20	SPORTS
14	B18EE4X20	DRAMATICS
15	B18EE4X20	INDIAN CLASSICAL DANCE FORMS
16	B18EE4X20	Music
17	B18EE5020	Switch Gear & Protection
18	B18EE5044	Python Programming
19	B18EE5052	Electric & Hybrid Vehicles
20	B18EE5062	Electrical Regulations & Safety
21	B18EE5064	Artificial Intelligence
22	B19EE5090	Soft Skill
23	B19EE5X10	Skill Development
24	B18EE6020	Signal Processing
25	B18EE6042	Energy storage systems
26	B18EE6045	Big Data Analytics & Cloud Computing
27	B18EE6054	Fundamentals of Robotics
28	B18EE6064	Analog & Digital Communication Systems
29	B18EE6065	Cryptography & Network Security
30	B18EE6090	Soft Skill
31	B18EE6X10	SWYAM/MOOC Course
32	B18EE6X20	Skill Development

33	B18EE7035	Software Testing
34	B18EE7060	Signal Processing Laboratory
35	B18EE8023	Wireless Communication
36	B18EE8024	Machine Learning Techniques

Program: M. Tech in Power and Energy System
Batch: 2018-2020

- The programme M. Tech in Power and Energy System is introduced in the year 2018-2019.

M Tech-Power & Energy System (Full time)

Scheme of Instructions

(Effective from Academic Year 2018 - 20)

I Semester

Sl No	Course Code	Subject	HC/SC /OE	L	T	P	Total credit	Contact hrs
1	M18PS1010	Applied Mathematics	HC	4	0	0	4	4
2	M18PS1020	Computer Aided Power System Operation and Analysis	HC	4	1	0	4	6
3	M18PS1030	Power System Protection	HC	4	1	0	5	6
4	M18PS1040	Analysis of Power Converters	HC	4	0	1	5	6
5	M18PS1051	Advanced Electrical Machines	SC	4	1	0	4	6
	M18PS1052	Power system Instrumentation						
	M18PS1053	SCADA and PLC System and Application						
	M18PS1054	Energy Storage Technology						
6	M18PS1061	FACTS Controller	SC	4	1	0	4	6
	M18PS1062	Grid Integration to Renewable Energy System						
	M18PS1063	Reactive Power Management						
	M18PS1064	Recent Trends in Grid Technology (Smart Grid)						
TOTAL CREDITS				**24**	**4**	**1**	**26**	**34**

II Semester

Sl No	Course Code	Subject	HC/SC /OE	L	T	P	Total credit	Contact hrs
1	M18PS2010	Solar Energy System	HC	4	1	0	5	6
2	M18PS2020	Energy Conservation and Demand side Management	HC	4	0	1	4	6
3	M18PS2030	HVDC Transmission	HC	4	1	0	5	6
4	M18PS2041	Electric vehicle	SC	4	1	0	4	6
	M18PS2042	AC-DC Drives						
	M18PS2043	Advanced Energy Systems						
	M18PS2044	FPGA Application						
5	M18PS2051	Power Quality and Harmonics Mitigation	SC	4	1	0	4	6
	M18PS2052	EMC / EMI / Power Transients						
	M18PS2053	Reliability Engineering						
	M18PS2054	Wind energy System						
6	M18PS2061	Multilevel Inverter	SC	4	0	0	4	4
	M18PS2062	Environmental Impacts of Energy Conversion and Safety						
	M18PS2063	Trouble shooting & Maintenance of equipment						
	M18PS2064	Green Building Technology						
TOTAL CREDITS				**24**	**4**	**1**	**26**	**34**

III Semester

Sl No	Course Code	Subject	HC/SC /OE	L	T	P	Total credit	Contact hrs
1	M18PS3011	Electricity Regulations	SC	4	0	0	4	4
	M18PS3012	Power System Dynamics and Control						
	M18PS3013	Power Economics & Trading						
	M18PS3014	Project Management & Report writing						
2	-	Open Elective subject offered by other school	SC	4	0	0	4	4
3	M18PS3030	Skill Development Program / Certification program	RULO	4	0	0	4	4
4	M18PS3040	Mini Project / Internship	HC	0	0	8	8	16
5	M18PS3050	MOOC/SWAYAM/	RULO	2	0	0	2	2
6	M18PS3060	Yoga/Sports/Performing Arts	RULO	0	0	2	2	4
TOTAL CREDITS				**14**	**0**	**10**	**24**	**34**

Semester IV

Sl No	Course Code	Subject	HC/SC /OE	L	T	P	Total credit	Contact hrs
1	M18PS4010	Project Work and Dissertation	HC	0	4	16	20	40
TOTAL CREDITS				**0**	**4**	**16**	**20**	**40**

2. S.K. Pillai - Analysis of thyristor power conditioned motors, University press.
3. Vedam Subramanyam - Electric Drives – concepts and publications, Tata Mc Graw –Hill.
4. R. Krishnan – Electric Motor Drives, Prentice Hall Ltd.
5. W. Leonhard – control of electric drives, Springer-Verlag.
6. T.J.E. Miller – Brushless PM and Reluctance Motor Drives, clarendon Press Oxford.

Sub Code: **M18PS2043**	**Advanced Energy Systems**	**L**	**T**	**P**	**C**	**CH**
Duration: 14 Weeks		**4**	**1**	**0**	**4**	**6**

Course Objectives:

1. To Provide An Overview Hydrogen Extraction Processes
2. To Study The Inherent Risks Associated With Hydrogen Storage and Delivery
3. To Impart Knowledge About Fuel Cell Technologies
4. To Introduce Key Concepts Of Magneto hydrodynamic Power Generation
5. To Introduce general Concepts of Thermoelectric and Thermionic Power Conversion Systems.

Course Outcomes:

On completion of this course the students will be able to:

1. The Students Will be Equipped With the Basic Knowledge Of Hydrogen Production, Storage And Delivery.
2. The Students Will be Able to Illustrate and Analyze Various Fuel Cells And Their Performance.

Course Contents:

UNIT 1: Hydrogen Energy **[12 Hrs]**

Downside of Solar Wind and other Perpetual Energy Technologies, Introduction To Hydrogen Energy, Properties of Hydrogen, Hydrogen as Energy Carrier, Production of Hydrogen – Thermo-chemical method, Electrolysis of Water, Thermolysis of Water and Biophotolysis, Storage and Delivery of Hydrogen, Safety Concerns, Applications and Present Status and The Concept of Hydrogen Economy

UNIT 2: Fuel Cells **[14 Hrs]**

The Concept of Fuel Cell, Potential Applications, Classification of Fuel Cells, Components and Working Principle of Fuel Cells, Efficiency of Fuel Cells, V – I Characteristics of Fuel Cells, Factors Affecting the Performance of Fuel Cells, Phosphoric Acid Fuel Cell, Alkaline Fuel Cells, Direct Ethanol Fuel Cell, Solid Oxide Fuel Cell, Comparative Study of Fuel Cells and Redox – Flow Batteries, Fuel Cell Power Plant, Pros and Cons of Fuel Cells, Environmental Impacts and Current Technological Status

UNIT 3: Magneto hydrodynamic Power Conversion Technology **[14 Hrs]**

Idea of Magneto hydrodynamics, Basic Principle of Faraday generator, Hall generator, Construction and Working of MHD Generator, Advantages and Limitations of MHD Systems, MHD Power Generation Systems – Oen Cycle MHD Generating System, Seeded Inert Gas Closed Cycle MHD Generating System, Fast Breeder Reactor Coupled Closed Cycle MHD Generating System

Unit – 4: Thermoelectric Power Conversion Technology **[12 Hrs]**

Introduction, Seebeck Effect in an Elementary Thermocouple, Peltier Eddect, Connstruction and Operation of Thermoelectric Power Generator, Thermal Efficiency, Peltier Cooler, Advantages and Limitations of the Technology, Concept of Thermionic Power Conversion System, Materials Employed and Limitations of the Technology

Text Books and Reference Books:

1. Non – conventional Energy Resources by B. H. Khan (3rd Edition); McGraw Hill Education
2. Introduction To Modern Magneto hydrodynamics (2016) by Sebastien Galtier; Cambridge University Press
3. MHD Power Generation: Selected Problems of Combustion MHD Generators (1975) by R. Bunde, H. Muntenbruch, J. Reeder, R. Volk and G. Zanki; Springer – Verlag
4. MIT Open Course Ware (Online Content, USA)
5. National Renewable Energy Laboratory (Online Content, The Government of USA)

Sub Code: **M18PS2044**	**FPGA Application**	**L**	**T**	**P**	**C**	**CH**
Duration: 14 Weeks		**4**	**1**	**0**	**4**	**6**

Course Objectives:

1. To implement various digital circuits using Programmable Logic Devices.
2. Implement various logical circuits using CMOS circuits

Course Outcomes:

1. Design simple logic circuits using data flow, structural and behavioral modeling concepts.
2. Implement combinational and sequential circuits.
3. Design of logic circuits using CMOS circuits.

Course Contents:

UNIT I: [12Hrs]

Programmable logic Devices and their evolution: ROM, PLA, PAL, CPLD, FPGA Features, Architectures and Programming.

Reprogrammable devices, Applications and Implementation of MSI circuits using Programmable logic Devices.

UNIT II: [12Hrs]

FPGAs: Field Programmable Gate Arrays- Logic blocks, routing architecture, design flow, technology mapping for FPGAs, Case studies Xilinx XC4000 & ALTERA's FLEX 8000/10000 FPGAs.

UNIT III: [12Hrs]

REVA UNIVERSITY
Bengaluru, India

SCHOOL OF COMMERCE

25-04-17

To

The Vice Chancellor

REVA University

Bengaluru-64

Respected Sir

Sub:- Request to permit to conduct BOS meeting on 28/04/2017.

With reference to subject cited above, School of Commerce proposes to conduct Board of Studies meeting on 28th April 2017 to review the following.

1. Syllabus of B.Com (Industry Integrated), B.Com (H) and M.Com
2. Course work curriculum for Ph.D
3. Open electives for UG and PG
4. Any other matter with permission of chair.

Prof. Shubha A

Director

School of Commerce

Director
School of Commerce
REVA University
Rukmini Knowledge Park, Kattigenahalli
Yelahanka, Bengaluru - 560 064

Prof. P .Narayana Reddy

Dean

Faculty of Commerce and Management Studies

REVA UNIVERSITY
Bengaluru, India

SCHOOL OF COMMERCE

The Fifth meeting of School of Commerce is convened on 28-04-2017 at 2.00 PM in Conference Room, Administrative Block, REVA University, Rukmini Knowledge Park, Bangalore-64.

Agenda:

1. Syllabus of B.Com (Industry Integrated), B.Com (H) and M.Com
2. Course work curriculum for Ph.D
3. Open electives for UG and PG
4. Any other matter with permission of chair.

Director
School of Commerce
REVA University
Rukmini Knowledge Park, Kattigenahalli
Yelahanka, Bengaluru - 560 064

Proceedings:

At the outset Prof. P Narayana Reddy, Chairperson, Board of Studies School of Commerce, REVA University welcomed the members of BOS for the deliberations. He highlighted few aspects to be focused in the BOS. The detailed discussions were held as for the agenda as follows:

Agenda No. 1: ***Syllabus of B.Com (Industry Integrated), B.Com (H) and M.Com.***

Resolution: After thorough discussion, the members present felt that there is no need for any changes in the Syllabus of B.Com (Industry Integrated), B.Com (H) and M.Com but with respect to credits few courses credits were re-allocated in UG Program (B.Com and B.Com (H), with the changes in credits syllabus was approved.

Agenda No. 2: ***Course work curriculum for Ph.D.***

Resolution: After thorough discussion, the members present opined that there is no need for any changes in the Syllabus of Course work curriculum for Ph.D, Hence approved the same as it is.

Agenda No. 3: ***Open electives for UG and PG.***

Resolution: The committee after thorough deliberations decided to offer E- Commerce course for undergraduate students and Introduction to Financial management for Postgraduate students. Also the committee members suggested to have more options for selection of open electives.

Agenda No. 4: ***Finalization of adjudicators for Ph.D. first batch.***

Resolution: After thorough discussion by the BOS members, for deciding the list of Adjudicators for the PhD dissertations to be submitted by the Ph.D Scholars pursuing research leading to Doctoral Degree under REVA University. The BOS members finalized a list of 6 Adjudicators within the state of Karnataka and 6 adjudicators outside the state of Karnataka, for each Ph.D Scholar who is ready for submission of his / her thesis.

Agenda No. 5: ***Any other matter with the permission of the Chair***

Resolution: The calendar of events for the Semesters I, III, V of B.Com and I, III M.Com. Ph.D course work schedule was approved.

The meeting ended with vote of thanks by the Chairperson.

REVA UNIVERSITY ★ SCHOOL OF COMMERCE ★

REVA UNIVERSITY
Bengaluru, India

SCHOOL OF COMMERCE

BOARD OF STUDIES

Proceedings of the Board of Studies (BOS) Meeting at Conference Room, Administrative Block, REVA University , Benagaluru-64 held on 28th April 2017 at 2:00 PM

Members Presnt:

Sl. No	Name of the Member	Designation	Signature
1.	Prof. Narayana Reddy Dean, Faculty of Commerce & Management Studies REVA University profpnr@yahoo.co.in 9440114709	Chairperson	
2.	Prof. S Ramesh Dean, Mount Carmel College, Bengaluru deanpgcom@mccblr.co.in 9844022611	External Member	28/4/17
3.	Prof. AV Ramana S K Uinversity, Anantapur skuramana@yahoo.com 9511840473 — 9440982542	External Member	28/4/17
4.	Prof. B.Ramesh Goa University brames@rediffmail.com 9511840473	External Member	28/4/17
5.	Prof. Vatsala Director of Commerce, Sheshadripuram First Grade College, Bengaluru drvatsala35@gmail.com 9880941320	External Member	Vatsala-4 28/04/17
6.	Shri. Nagendra HDFC	External Member	AB
7.	CA. Phalguan Iyengar Charted Accountant Co-Founder SPHADRA adoptadeptachieve@gmail.com 9738128890	External Member	AB
8.	CA. Ravindra CS Charted Accountant and Company Secretary ravindra@rsca.co.in 9900859639	External Member	AB

9.	Ms.Uzma Khadeer Manager- Fresher Hiring, Capgemini technology services India Ltd. Bengaluru-37 Uzma.khadeer@capgemini.com 8884174333	External Member	AB
10.	Mr.Guru Prasad HR – KPMG 9886124645	External Member	AB
11.	Prof. Shubha A Director School of Commerce, REVA University dir.comm@reva.edu.in/ shubha@revainstitution.org 8095491949	Member	
12.	Dr.M Subramanyam Associate Professor School of Commerce, REVA University drmutyala@reva.edu.in 9632390819	Members	
13.	Prof. Kantha Raju G Assistant professor School of Commerce, REVA University gkantharaju@reva.edu.in 8105836968	Member	
14.	Prof. Karthik Reddy Assistant professor School of Commerce, REVA University karthikreddy@reva.edu.in 9980806670	Member	KarthikReddy

Prof. Shubha A

Director

School of Commerce

Prof. P .Narayana Reddy

Dean

Faculty of Commerce and Management Studies

Annexure - I

B. COM -INDUSTRY INTEGRATED

Scheme of Instruction **Duration: 6 Semesters (3 Years)**

Sl. No	Course Code	Title of the Course	HC/SC/ SE/CC	Credit Pattern			
				L	T	P	Total
FIRST SEMESTER							
1	BCOM16F1100	Communicative English and Critical Awareness	CC	2	1	0	3
2	BCOM16F1200	Language – II: K / H / AE	CC	2	1	0	3
3	BCOM16F1300	Business organization and Management	HC	3	1	0	4
4	BCOM16F1400	Financial Accounting	HC	3	0	1	4
5	BCOM16F1500	Micro Economics	HC	3	1	0	4
6	BCOM16F1600	Business Law	HC	2	1	0	3
7	BCOM16F1700	Computer Applications	FC	2	0	1	3
Total Credits				**17**	**5**	**2**	**24**
SECOND SEMESTER							
1	BCOM16F2100	Business Communication	CC	2	1	0	3
2	BCOM16F2200	Language – II: K / H / AE	CC	2	1	0	3
3	BCOM16F2300	Corporate Accounting-I and Tally	HC	3	0	1	4
4	BCOM16F2400	Marketing Management	HC	2	1	0	3
5	BCOM16F2500	Business statistics	HC	3	0	1	4
6	BCOM16F2600	Macro economics	HC	3	1	0	4
7	BCOM16F2700	Environmental Studies	FC	2	0	1	3
Total Credits				**16**	**5**	**2**	**24**
THIRD SEMESTER							
1	BCOM16F3100	Auditing	HC	3	1	0	4
2	BCOM16F3200	Cost Accounting	HC	3	0	1	4
4	BCOM16F3300	Corporate Accounting – II	HC	3	0	1	4
5	BCOM16F3400	Human Resource Management	HC	2	1	0	3
6	BCOM16F3500	Corporate Administration	HC	2	1	0	3
7	BCOM16F3600	Indian Constitution And Human Rights	FC	2	0	0	2
8	BCOM16F3700	E-Commerce	OE	3	0	1	4
Total Credits				**18**	**3**	**3**	**24**
FOURTH SEMESTER							
1	BCOM16F4100	Taxation-I	HC	3	0	1	4
2	BCOM16F4200	Financial Management	HC	3	0	1	4
3	BCOM16F4300	Management Accounting	HC	3	0	1	4
4	BCOM16F4400	Costing Methods	HC	3	0	1	4
5	BCOM16F4500	E-Commerce and Tally	SC	2	0	1	3
Specializations (Soft Core Courses(SC)); * Choose any ONE of the following specializations							
I. Accounting and Taxation Specialization							

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II. Finance Specialization							
III. Banking and Insurance Specialization							
I. Accounting and Taxation Specialization							
6	BCOM16F4A11	Advanced Accounting	SC	3	0	1	4
	BCOM16F4A12	Business Taxation - I	SC	3	0	1	4
II. Finance Specialization							
7	BCOM16F4F11	Corporate Financial Policy	SC	3	0	1	4
	BCOM16F4F12	International Finance	SC	3	0	1	4
III. Banking and Insurance Specialization							
8	BCOM16F4B11	Introduction to Banking and Insurance	SC	3	1	0	4
	BCOM16F4B12	International Banking and Forex Management	SC	3	1	0	4
Total Credits							**27**
FIFTH SEMESTER							
1	BCOM16F5100	Taxation II	HC	3	0	1	4
2	BCOM16F5200	Business Ethics and Corporate Governance	HC	3	1	0	4
3	BCOM16F5300	Indian Financial System	HC	3	1	0	4
4	BCOM16F5400	Business Research Methods	HC	3	0	1	4
5	BCOM16F5500	Corporate Risk Management	HC	3	0	1	4
Specializations (Soft Core Courses(SC)); Choose any ONE of the following specialization							
I. Accounting and Taxation Specialization							
6	BCOM16F5A11	Business Taxation - II	SC	3	0	1	4
	BCOM16F5A12	International Financial Reporting Standards	SC	3	0	1	4
II. Finance Specialization							
7	BCOM16F5F11	Advanced Financial Management	SC	3	0	1	4
	BCOM16F5F12	Security Analysis and Portfolio Management	SC	3	0	1	4
III. Banking and Insurance Specialization							
8	BCOM16F5B11	Life and General Insurance	SC	3	1	0	4
	BCOM16F5B12	Marketing of Insurance Products	SC	3	1	0	4
Total Credits							**28**
SIXTH SEMESTER							
1	BCOM16F6100	Entrepreneurship Development	HC	3	1	0	4
2	BCOM16F6200	Stock and Commodity Markets	HC	3	1	0	4
3	BCOM16F6300	Major Project / Internship	HC	0	2	7	9
		Total Credits					**17**
		Total Credits of all Semesters					**144**

Semester-wise Summary of Credit Distribution

Semesters	No. of Credits
First Semester	24
Second Semester	24
Third Semester	24
Fourth Semester	27
Fifth Semester	28
Sixth Semester	17
Total Credits	**144**

Annexure - II

B. COM - HONOURS

Scheme of Instruction **Duration: 6 Semesters (3 Years)**

Sl. No	Course Code	Title of the Course	HC/SC/ SE/CC/	Credit Pattern			
				L	T	P	Total
FIRST SEMESTER							
1	BCHO16F1100	Communicative English and Critical Awareness	CC	2	1	0	3
2	BCHO16F1200	Language – II: K / H / AE	CC	2	1	0	3
3	BCHO16F1300	Financial Accounting	HC	3	0	1	4
4	BCHO16F1400	Micro Economics	HC	3	1	0	4
5	BCHO16F1500	Business Laws	HC	3	1	0	4
6	BCHO16F1600	Investing in Stock Markets	HC	3	1	0	4
7	BCHO16F1700	Environment and Public Health	FC	2	0	1	3
Total Credits							**25**
SECOND SEMESTER							
1	BCHO16F2100	Communicative English and Critical Awareness	CC	2	1	0	3
2	BCHO16F2200	Language – II: K / H / AE	CC	2	1	0	3
3	BCHO16F2300	Corporate Accounting	HC	3	0	1	4
4	BCHO16F2400	Business statistics	HC	3	0	1	4
5	BCHO16F2500	Corporate Laws	HC	3	1	0	4
6	BCHO16F2600	Macro economics	HC	3	1	0	4
7	BCHO16F2700	Constitution of India and Human Rights	FC	2	0	0	2
Total Credits							**24**
THIRD SEMESTER							
1	BCHO16F3100	Corporate Communication	SC	2	0	1	3
2	BCHO16F3200	Office Management and Secretarial Practice	SC	2	0	1	3
3	BCHO16F3300	Cost Accounting	HC	3	0	1	4
4	BCHO16F3400	Fundamentals of Financial Management	HC	3	0	1	4
5	BCHO16F3500	Insurance and Risk Management	HC	3	1	0	4
6	BCHO16F3600	Project (IRP)/Minor Project	SC	0	0	6	6
7	BCHO16F3700	Personality Development and Leadership(Open elective offered by commerce to management)	OE	2	1	0	3
Total Credits							**27**
FOURTH SEMESTER							
1	BCHO16F4100	Management Accounting	HC	3	0	1	4
2	BCHO16F4200	Investment Management	HC	3	0	1	4
3	BCHO16F4300	New Venture Planning	HC	3	1	0	4

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4	BCHO16F4400	Human Resource Management	SC	3	1	0	4
5	BCHO16F4500	Principles of Marketing	SC	3	1	0	4
6	BCHO16F4600	Auditing and Corporate Governance	SC	3	1	0	4
7	BCHO16F4700	Business Research Methodology	HC	3	1	0	4
Total Credits							**28**
FIFTH SEMESTER							
1	BCHO16F5100	Income Tax and Practice-I	HC	3	0	1	4
2	BCHO16F5200	International Business	HC	2	1	0	3
3	BCHO16F5300	Financial Reporting and Analysis	SC	3	0	1	4
4	BCHO16F5300	Financial Markets and Services	SC	2	1	0	3
4	BCHO16F6400	Major Project Based on Specialization (Evaluation in Sixth Semester)	HC	-	-	-	-
Specializations (Soft Core Courses(SC))*							
I. Accounting and Taxation							
II. Accounting and Financial Management							
III. Costing and Taxation							
* Choose any ONE specializations							
I. Accounting and Taxation							
1	BCHO16F5A11	Advanced Accounting - I	SC	2	0	1	3
2	BCHO16F5A12	Indirect taxes – I	SC	2	0	1	3
II. Accounting and Financial Management							
1	BCHO16F5A11	Advanced Accounting - I	SC	2	0	1	3
2	BCHO16F5F12	Advanced Financial Management	SC	2	0	1	3
III. Costing and Taxation							
1	BCHO16F5C11	Techniques of Cost Analysis and Control	SC	2	0	1	3
2	BCHO16F5A12	Indirect taxes – I	SC	2	0	1	3
Total Credits							**20**
SIXTH SEMESTER							
1	BCHO16F6100	Income Tax and Practice-II	SC	3	0	1	4
2	BCHO16F6200	Business Policy and Environment	SC	3	1	0	4
3	BCHO16F6300	Personal Financial Planning	HC	3	1	0	4
4	BCHO16F6400	Major Project Based on Specialization	HC	0	2	6	8
Specializations (Soft Core Courses(SC))*							
I. Accounting and Taxation							
II. Accounting and Financial Management							
III. Costing and Taxation							
* Choose any ONE specializations							
I. Accounting and Taxation							
1	BCHO16F6A13	Advanced Accounting - II	SC	2	0	1	3
2	BCHO16F6A14	Indirect taxes - II	SC	2	0	1	3
II. Accounting and Financial Management							

1	BCHO16F6A13	Advanced Accounting - II	SC	2	0	1	3
2	BCHO16F6F14	Security Analysis and Portfolio Management	SC	2	0	1	3
III. Costing and Taxation							
1	BCHO16F6C13	Strategic Cost Management	SC	2	0	1	3
2	BCHO16F6A14	Indirect taxes - II	SC	2	0	1	3
Total Credits							**26**
Total Credits of all Semesters							**150**

Semester-wise Summary of Credit Distribution

Semesters	No. of Credits
First Semester	25
Second Semester	24
Third Semester	27
Fourth Semester	28
Fifth Semester	20
Sixth Semester	26
Total Credits	**150**

Approved by: BOS/SOC/UG-PG/28-04-2017/05

Annexure - III

M Com (MASTER OF COMMERCE)

(With Effect from 2017-18)

Eligibility: B Com / BBM / BBA / BBS / with 45% (40% in case of candidates belonging to SC/ ST) of marks in aggregate of any recognized university / institution or any other qualification recognized as equivalent there to.

Scheme of Instruction

Sl No	Course Code	Title of the Course	HC SC OE	Credit Pattern				Contact Hrs
				L	T	P	Total	
FIRST SEMESTER								
1.	MCOM16F1100	Management and Organisation Behaviour	HC	2	1	0	3	04
2.	MCOM16F1200	Advanced Accounting	HC	4	0	1	5	06
3.	MCOM16F1300	Legal aspects of business	HC	2	1	0	3	04
4.	MCOM16F1400	Quantitative Techniques and Operations Research	HC	4	0	1	5	06
5.	MCOM16F1500	Economics for Business Decisions	HC	2	1	0	3	04
6.	MCOM16F1600	Marketing Management	HC	2	1	0	3	04
		Total Credits					**22**	**28**
SECOND SEMESTER								
1.	MCOM16F2100	Banking and financial services	HC	2	1	0	3	04
2.	MCOM16F2200	Business Ethics and Corporate Governance	HC	2	1	0	3	04
3.	MCOM16F2300	Advanced Cost Accounting	HC	4	0	1	5	06
4.	MCOM16F2400	Strategic Financial Management	HC	4	0	1	5	06
5.	MCOM16F2500	Direct Taxes Law and practice	HC	4	0	1	5	06
6.	MCOM16F2600	Human resource management	HC	2	1	0	3	04
		Total Credits					**24**	**30**
THIRD SEMESTER								
1	MCOM16F3100	Business research methods	HC	3	1	0	4	05

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2	MCOM16F3200	Introduction to Financial Management	OE	2	1	0	3	04

	I) ACCOUNTING AND TAXATION **a) ACCOUNTING**							
1	MCOM16F3A10	Advanced Management Accounting	SC	3	0	1	4	05
2	MCOM16F3A20	Mergers and Acquisitions	SC	3	0	1	4	05
3	MCOM16F3A30	Financial Statement Analysis	SC	3	0	1	4	05
4	MCOM16F3A40	Contemporary Areas of Financial Accounting	SC	3	0	1	4	05
	b) TAXATION							
1	MCOM16F3T10	Indirect Taxation-1	SC	3	0	1	4	05
2	MCOM16F3T20	Corporate Tax Planning and Management	SC	3	0	1	4	05
3	MCOM16F3T30	International Taxation	SC	3	0	1	4	05
4	MCOM16F3T40	Business and Corporate Taxation	SC	3	0	1	4	05
Note: **Choose TWO Courses from each a & b.**								

	II) ACCOUNTING AND FINANCE **a) ACCOUNTING**							
1	MCOM16F3A10	Advanced Management Accounting	SC	3	0	1	4	05
2	MCOM16F3A20	Mergers and Acquisitions	SC	3	0	1	4	05
3	MCOM16F3A30	Financial Statement Analysis	SC	3	0	1	4	05
4	MCOM16F3A40	Contemporary Areas of Financial Accounting	SC	3	0	1	4	05
	b) FINANCE							
1	MCOM16F3F10	Security Analysis and Portfolio Management	SC	3	0	1	4	05
2	MCOM16F3F20	Financial Derivatives	SC	3	0	1	4	05
3	MCOM16F3F30	Strategic Credit Management	SC	3	0	1	4	05
4	MCOM16F3F40	Advanced Capital Structure Theories	SC	3	0	1	4	05
		Total Credits					**23**	**29**
Note: **Choose TWO Courses from each a & b.**								

FOURTH SEMESTER								

1	MCOM16F4100	Innovation and Entrepreneurship	HC	2	1	0	3	04
2	MCOM16F4200	Major Project	HC	0	2	6	8	16

I) ACCOUNTING AND TAXATION

a) ACCOUNTING

1	MCOM16F4A10	Strategic Cost management	SC	3	0	1	4	05
2	MCOM16F4A20	Corporate Financial Reporting	SC	3	0	1	4	05
3	MCOM16F4A30	Accounting Theory and Standards	SC	3	0	1	4	05
4	MCOM16F4A40	International Accounting	SC	3	0	1	4	05

b) TAXATION

1	MCOM16F4T10	Indirect Taxation -2	SC	3	0	1	4	05
2	MCOM16F4T20	Principles and Practice of Taxation and Indian Tax System	SC	3	0	1	4	05
3	MCOM16F4T30	E-Filing of Returns	SC	3	1	0	4	05
4	MCOM16F4T40	Assessment of Various Entities & Tax Planning	SC	3	0	1	4	05

Note: Choose TWO Courses from each a & b.

II) ACCOUNTING AND FINANCE

a) ACCOUNTING

1	MCOM16F4A10	Strategic Cost management	SC	3	0	1	4	05
2	MCOM16F4A20	Corporate Financial Reporting	SC	3	0	1	4	05
3	MCOM16F4A30	Accounting Theory and Standards	SC	3	0	1	4	05
4	MCOM16F4A40	International Accounting	SC	3	0	1	4	05

b) FINANCE

1	MCOM16F4F10	International financial management	SC	3	0	1	4	05
2	MCOM16F4F20	Corporate Financial Reporting	SC	3	0	1	4	05
3	MCOM16F4F30	Risk Management and Insurance	SC	3	0	1	4	05
4	MCOM16F4F40	Commodity Market	SC	3	1	0	4	05

Note: Choose TWO Courses from each a & b.

	Total Credits					**27**	**40**
	Total Credits of Four Semesters					**96**	**127**

REVA UNIVERSITY
Bengaluru, India

SCHOOL OF COMMERCE

B.COM (HONORS) HAND BOOK

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3. Chandra, Prasanna. Investment Analysis and Portfolio Management. Tata Mc Graw Hill.
4. Damodaran, Aswath, Investment Valuation: Tool and Techniques for Determining the Value of Any Assets. Wiley Finance.
5. Bodie. Alex., Marcus and Mohanty. Investments. McGraw Hill Publishing Co.
6. Hirt and Block, Fundamentals of Investment Management, McGraw Hill Publishing Co.
7. Pandiyan, Punithavathy, Security Analysis and Portfolio Management. Vikas Publications.
8. www.yahoofinance.com
9. www.moneycontrol.com
10. www.bloomberg.com

Course Code	Duration	Course Title	L	T	P	C
BCHO16F1700	**16 weeks**	**ENVIRONMENT AND PUBLIC HEALTH**	**2**	**0**	**1**	**3**

COURSE OBJECTIVE:

To familiarize students with environmental issues as how to conserve, preserve our Environment.

COURSE OUTCOME:

Students will be able to develop concern for environment and its related aspects.

Level of Knowledge: Basic

UNIT 1 – Linkages between Environment and Health

Understanding linkages between Environment and Public Health Effect of quality of air, water and soil on health. Perspective on Individual health: Nutritional, socio –cultural and developmental aspects, Dietary diversity for good health; Human developmental indices for public health.

UNIT 2 – Climate Change and Implications on Public Health

Global warming – Agricultural practices (chemical agriculture) and Industrial technologies (use of non-biodegradable materials like plastics, aerosols, refrigerants, pesticides): Manifestations of Climate change on Public Health-Burning of Fossil fuels, automobile emissions and Acid rain.

UNIT 3 – Diseases in Contemporary Society

Definition – need for good health- factors affecting health. Types of diseases – deficiency, infection, pollution diseases-allergies, respiratory, cardiovascular, and cancer Personal hygiene-food – balanced diet. Food habits and cleanliness, food adulterants, avoiding smoking, drugs and alcohol.

Communicable diseases: Mode of transmission –epidemic and endemic diseases. Management of hygiene in public places – Railway stations, Bus stands and other public places. Infectious diseases: Role of sanitation and poverty case studies on TB, diarrhea, malaria, viral diseases. Non-communicable diseases: Role of Lifestyle and built environment. Diabetes and Hypertension.

UNIT 4 – Perspectives and Interventions in Public Health

Epidemiological perspective – Disease burden and surveillance; Alternative systems of medicine – Ayurveda, Yoga, Unani, Siddha and Homeopathy (AYUSH); Universal Immunization Programme (UIP); Reproductive health-Youth Unite for Victory on AIDS (YUVA) programme of Government of India. Occupational health hazards-physical-chemical and biological, Occupational diseases-prevention and control.

UNIT 5 – Environmental Management Policies and Practices

Municipal solid waste management: Definition, sources, characterization collection and transportation and disposal methods. Solid waste management system in urban and rural areas. Municipal Solid waste rules.

Policies and practices with respect to Environmental Protection Act, Forest Conservation Act, Wild life protection Act, Water and Air Act, Industrial, Biomedical and E waste disposal rules.

Course Code	Duration	Course Title	L	T	P	C
BCHO16F6100	**16 weeks**	**PERSONAL FINANCIAL PLANNING**	**3**	**1**	**0**	**4**

COURSE OBJECTIVE:
The aim of the course is to provide basic principles for managing personal finance.

COURSE OUTCOME:
It enables students to manage their finances through proper savings and investments.
Level of Knowledge: Conceptual

Course Contents:
UNIT 1:
Basics of Personal Financial Management: ThePersonal Financial Planning Process, Preparation of Personal Budget, Personal Financial Statements, Personal Income Tax Planning. Case studies on Personal Financial Planning of individuals.

UNIT 2:
Personal Savings & Investment: Investment Criteria- liquidity, safety and profitability. Savings instruments of Post Office and Banks. Chit funds. Investment in Shares, Debentures, Corporate and Government Bonds, Mutual Bonds. Investment in Physical Assets- Real Estate, Gold and Silver. Risk and Return associated with these investments. Case studies on risk and return perception of retail investors on various investments.

UNIT 3:
Computation of Return and Risk of Personal Investment: Present Value and Future Value of a S ingle Amount and an Annuity. Computation of interest, dividend and capital gains on personal investments. Impact of leverage on return. Personal tax planning.

UNIT 4:
Retirement Savings Plan: Pension Plans- Defined Contribution Plan and Defined Benefit Plan. Provident fund, Gratuity. Life Insurance Plans. Reverse Mortgage Plans.

REFERENCE BOOKS:

1. Personal Finance by Jack R. Kapoor, Les R. Dlabay and Robert J. Hughes, Tat McGraw-Hill Publishing company Ltd, New Delhi.
2. Financial Education by Reserve Bank of India – rbi.org
3. Personal Finance columns in The Economic Times, The Business Line and Financial Express Daily News Papers.
4. Information Brochures of Post Office, Banks, Mutual Funds, Insurance Companies.
5. Internet Sources- BSE, NSE, SEBI, RBI, IRDA, AMFI etc.

CAREER COUNSELING AND PLACEMENT

Having a degree will open doors to the world of opportunities for you. But Employers are looking for much more than just a degree. They want graduates who stand out from the crowd and exhibit real life skills that can be applied to their organizations. Examples of such popular skills employers look for include:

- Willingness to learn
- Self motivation
- Team work
- Communication skills and application of these skills to real scenarios
- Requirement of gathering, design and analysis, development and testing skills
- Analytical and Technical skills
- Computer skills
- Internet searching skills
- Information consolidation and presentation skills
- Role play
- Group discussion, and so on

REVA University therefore, has given utmost importance to develop these skills through variety of training programs and such other activities that induce the said skills among all students. A full-fledged Career Counseling and Placement division, namely Career Development Center (CDC) headed by well experienced senior Professor and Dean and supported by dynamic trainers, counselors and placement officers and other efficient supportive team does handle all aspects of Internships and placements for the students of REVA University. The prime objective of the CDC is to liaison between REVA graduating students and industries by providing a common platform where the prospective employer companies can identify suitable candidates for placement in their respective organization. The CDC organizes pre-placement training by professionals and also arranges expert talks to our students. It facilitates students to career guidance and improve their employability. In addition, CDC forms teams to perform mock interviews. It makes you to enjoy working with such teams and learn many things apart from working together in a team. It also makes you to participate in various student clubs which helps in developing team culture, variety of job skills and overall personality.

The need of the hour in the field of Commerce is efficient leaders of repute, who can deal the real time problems with a flavour of innovation. This kept in focus, the CDC has designed the training process, which will commence from second semester along with the curriculum. Special coaching in personality development, career building, English proficiency, reasoning, puzzles, leadership, and strategic management and communication skills to every student of REVA University is given with utmost care. The process involves continuous training and monitoring the students to develop their soft skills including interpersonal skills that will fetch them a job of repute in the area of his / her interest and march forward to make better career.

The University has recognized skill development and industry relationship as its very important activities. Therefore, the University-Industry Interaction and Skill Development Centre headed by a Senior Professor & Director has been established to facilitate skill related training to REVA students and other unemployed

students around REVA campus. The center conducts variety of skill development programs to students to suite to their career opportunities. Through this skill development centre the students shall compulsorily complete at least two skill / certification based programs before the completion of their degree. The University has collaborations with Industries, Corporate training organizations, research institutions and Government agencies like NSDC (National Skill Development Corporation) to conduct certification programs. REVA University has been recognised as a Centre of Skill Development and Training by NSDC (National Skill Development Corporation) under Pradhan Mantri Kaushal Vikas Yojana.

The University has signed MOU's with Multi-National Companies, research institutions, Government agencies like NSDC (National Skill Development Corporation) and universities abroad to facilitate greater opportunities of employability, students' exchange programs for higher learning and for conducting certification programs.

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