

ANNEXURE - 34.7.2.3A

Amendments in 2018 Regulations for the award of B.E/B.Tech. Honors / Honors with specialization / Minor Degree

6.7 B.E. / B. Tech. (Hons) Specialisation in the same discipline, B.E. / B. Tech. (Hons) and B.E. / B. Tech. minor in other specialisation.

(i) B.E./B.Tech. Honours (specialisation in the same discipline):

- a. The student should have earned additionally a minimum of 18 credits from a vertical of the same programme.
- b. Should have passed all the courses in the first attempt.
- c. Should have earned a minimum CGPA of 7.50.

(ii) B.E / B.Tech.Honours

- a. The students should have earned additional courses (minimum of 18 credits) from more than one vertical of the same programme.
- b. Should have passed all the courses in the first attempt.
- c. Should have earned a minimum CGPA of 7.50.

(iii) B.E./B.Tech. (minor in other specialisation)

The student should have earned additionally a minimum of 18 credits in any one of the verticals of other B.E/B.Tech programmes or from any one of the following verticals

2. Students can earn maximum of 6 credits in online mode (SWAYAM platform),out of these 18 credits as approved by Board of studies concerned
3. B.E./ B. Tech. (Hons) Specialisation in the same discipline, B.E / B.Tech. Honors and B.E./B.Tech. minor in other specialisation degree will be optional for students.
4. For the categories 1 (i) to 1(ii), the students will be permitted to register the courses from V Semester onwards provided the marks earned by the students until III semester should be of CGPA 7.50 and above and cleared all the courses in the first attempt.
5. For the category1(iii),the students will be permitted to register the courses from Semester V onwards provided the marks earned by the students until Semester III is CGPA 7.50 and above.
6. If a student decides not to opt for Honours, after completing certain number of additional courses, the additional courses studied shall be considered instead of the Professional Elective courses which are part of the curriculum. If the student has studied more number of such courses than the number of Professional Elective courses required as per the curriculum, the courses with higher grades shall be considered for the calculation of CGPA. Remaining courses shall be printed in the gradesheet, however, they will not be considered for calculation of CGPA.

7. If a student decides not to opt for Minor, after completing certain number of courses, the additional courses studied shall be considered instead of Open Elective courses which are part of the curriculum. If the student has studied more number of such courses than the number of open electives required as per the curriculum, the courses with higher grades shall be considered for calculation of CGPA. Remaining courses shall be printed in the grade sheet, however, they will not be considered for calculation of CGPA.

14.2 CLASSIFICATION OF DEGREE

14.2.1. First Class with Distinction

Degree (i)	Duration of programme (ii)	Duration permitted (iii)	Additional credits above the requirement of curriculum (iv)	CGPA (v)	Pass in (vi)	Break of study (vii)	Prevention due to lack of attendance	Withdrawal from writing end semester examination (viii)
B.E./B.Tech. (Regular)	4 years	5 years	-	8.50	First attempt	One year authorized break of study included in the Duration permitted (iii)	Not permitted	Will not be considered as an attempt
B.E./B.Tech. (Lateral Entry)	3 years	4 years	-	8.50	First attempt	One year authorized break of study included in the Duration permitted (iii)	Not permitted	Will not be considered as an attempt
B.E./B.Tech. (Honours) Specialisation in the same discipline	3/4 years (Lateral entry, Regular, respectively)	4/5 years (Lateral entry, Regular, respectively)	18 credits from any one vertical of the same programme	8.50	First attempt	One year authorized break of study included in the Duration permitted (iii)	Not permitted	Will not be considered as an attempt
B.E./B.Tech. (Honours)	3/4 years (Lateral entry, Regular, respectively)	4/5 years (Lateral entry, Regular, respectively)	18 credits from more than one verticals of the same programme	8.50	First attempt	One year authorized break of study included in the Duration permitted (iii)	Not permitted	Will not be considered as an attempt
B.E./B.Tech. minor in other specialisation	3/4 years (Lateral entry, Regular, respectively)	4/5 years (Lateral entry, Regular, respectively)	18 credits from any one vertical of the other programme	8.50	First attempt	One year authorized break of study included in the Duration permitted (iii)	Not permitted	Will not be considered as an attempt

14.2.2. First Class

Degree (i)	Duration	Duration permitted (iii)	Additional credits (iv)	CGPA (v)	Pass in (vi)	Break of Study (vii)	Prevention due to lack of attendance	Withdrawal from writing examination (viii)
B.E./B.Tech. (Regular)	4 years	5 years	-	6.50	-	One year authorised break of study included in the Duration permitted(iii)	Included in the Duration permitted (iii)	-
B.E./B.Tech. Lateral Entry	3 years	4 years	-	6.50	-	One year authorised break of study included in the Duration permitted(iii)	Included in the Duration permitted (iii)	-
B.E./B.Tech. (Honours) Specialisation in the same discipline	3/4 years (Lateral entry, Regular, respectively)	4/5 years (Lateral entry, Regular, respectively)	18 credits from any one vertical of the same programme	7.50	First attempt	One year authorised break of study included in the Duration permitted(iii)	Not permitted	Will not be considered as an attempt
B.E./B.Tech. (Honours)	3/4 years (Lateral entry, Regular, respectively)	4/5 years (Lateral entry, Regular, respectively)	18 credits from more than one verticals of the same programme	7.50	First attempt	One year authorised break of study Included in the Duration permitted(iii)	Not permitted	Will not be considered as an attempt
B.E./B.Tech. minor in other specialisation	3/4 years (Lateral entry, Regular, respectively)	4/5 years (Lateral entry, Regular, respectively)	18 credits from more than one verticals of the other programme	6.50	-	One year authorised break of study Included in the Duration permitted(iii)	Included in the Duration permitted (iii)	

14.2.3. Second Class

B.E./B.Tech. Regular, lateral entry and B.E./ B.Tech. minor in other specialization degree students (not covered in clauses 14.2.1 and 14.2.2) who qualify for the award of the degree (vide Clause 14.1) shall be declared to have passed the examination in **Second Class**.

14.2.4. Student earned additional 18 credits as per Clause 6.7 (i) and (ii) but does not satisfy the conditions mentioned in 14.2.1 or 14.2.2 shall not be awarded B.E./B.Tech. Honours. In such cases the mark sheet will show the additional courses studied and those courses shall not be considered for CGPA computation. In such case, if the student becomes eligible for First Class, while computing CGPA without taking into account the additional course studied, the student shall be awarded B.E./B.Tech. in First Class only.

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DEPARTMENT OF CIVIL ENGINEERING - VERTICALS

Vertical I	Vertical II	Vertical III	Vertical IV	Vertical V
Structural Engineering	Environmental Engineering	Geotechnical Engineering	Infrastructure Engineering	Sustainability in Civil Engineering
18CPE\$01 - Steel Structures	18CPE\$11 - Design and Drawing (Irrigation and Environmental Engineering)	18CPE\$15 - Ground Improvement Techniques	18CPE\$09 - Safety in Civil Engineering Practices	18CPE\$37 - IoT in Construction
18CPE\$02 - Concrete Technology	18CPE\$12 - Environmental Legislations in India	18CPE\$29 - Slope Stability and Landslides	18CPE\$10 - Valuation	18CPE\$39 - GIS implementation in smart city development
18CPE\$03 - Finite Element Method	18CPE\$13 - Industrial Wastewater Management	18CPE\$30 - Earth Retaining Structures	18CPE\$16 - Pavement Engineering	18CPE\$40 - Sustainable Infrastructure Development
18CPE\$04 - Advanced Concrete Design	18CPE\$14 - Sustainable Engineering and Technology	18CPE\$31 - Foundations in Expansive Soil	18CPE\$17 - Airport, Docks and Harbour Engineering	18CPE\$41 Sustainable Environmental Management
18CPE\$05 - Basics of Dynamics and Aseismic Design of Structures	18CPE\$20 - Fundamentals of Remote Sensing and GIS Applications	18CPE\$32 - Land Reclamation	18CPE\$18 - Highways – State of Art	18CPE\$42 - Materials for Energy Sustainability
18CPE\$06 - Concrete Structures	18CPE\$22 - Irrigation Engineering and Hydraulic Structures	18CPE\$33 - Environmental Geotechnology	18CPE\$19 - Traffic Engineering and Management	18CPE\$43 - Green Technology
18CPE\$07 - Bridge Engineering	18CPE\$23 - Hydrology	18CPE\$34 - Reinforced Soil Structures	18CPE\$21 - Highway and Railway Engineering	18CPE\$44 Building Information Modeling
18CPE\$08 - Earthquake Engineering	18CPE\$26 - Environmental Management	18CPE\$35 - Design of Underground Excavations	18CPE\$37 - IoT in construction	18CPE\$47 - Modern Construction Equipments
18CPE\$24 - Maintenance and Rehabilitation of Structures	18CPE\$27 - Air Pollution Management	18CPE\$36 - Geotechniques for infrastructure	18CPE\$38 - Intelligent Building Techniques	
18CPE\$25 - Prefabricated Structures	18CPE\$28 - Integrated Urban Water Management	-	18CPE\$39 - GIS implementation in smart city development	

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DEPARTMENT OF MECHANICAL ENGINEERING - VERTICALS

Vertical I	Vertical II	Vertical III	Vertical IV	Vertical V	Vertical VI	Vertical VII
Modern Mobility Systems	Product and Process Development	Robotics and Automation	Digital and Green Manufacturing	Processes Equipment and Piping Design	Computational Engineering	Industrial Robotics and automation
18MPE\$27- Automotive materials, components, design and testing	18MPE\$33- Value Engineering	18MPE\$22- Industrial Robotics	18MPE\$26- Automation in Manufacturing	18MPE\$47- Design of Pressure Vessels	18MPE\$53- Computational Solid Mechanics	18MPE\$59- Principles of Robotics
18MPE\$28- Conventional and futuristic vehicle technology	18MPE\$17- Additive Manufacturing	18MPE\$37- Kinematics and Dynamics of Robotics	18MPE\$14- Lean Manufacturing	18MPE\$48- Failure Analysis and NDT Techniques	18MPE\$23- Computational Fluid Dynamics	18MPE\$60- Robotic Drives and Control Systems
18MPE\$29- Renewable powered off High Way Vehicles and Emission Control Technology	18MPE\$34- Computer Integrated Manufacturing	18MPE\$25- Instrumentation and Control	18MPE\$42- Modern robotics	18MPE\$49- Material handling and Solid processing equipment	18MPE\$54- Theory on computation and visualisation	18MPE\$61- Robot Motion Planning and Programming
18MPE\$30- Vehicle Health monitoring, Maintenance and Safety	18MPE\$24- Design for Manufacture	18MPE\$38- Field and Service Robotics	18MPE\$43- Green manufacturing design and Practices	18MPE\$50- Rotating Machinery design	18MPE\$55- Computational Bio-Mechanics	18MPE\$62- Robots Applications and Maintenance
18MPE\$31- CAE and CFD approach in future Mobility	18MPE\$35- Ergonomics in design	18MPE\$39- Medical and Space Robots	18MPE\$44- Environment Sustainability and Impact assessment	18MPE\$51- Thermal and Fired equipment design	18MPE\$56- Advanced statistics and data analytics	18MPE\$63- Robotic Process Automation
18MPE\$32- Hybrid and Electric Vehicle Technology	18MPE\$36- New product development	18MPE\$40- Robot Programming and Simulation	18MPE\$45- Energy saving Machinery and Components	18MPE\$05- Industrial Engineering	18MPE\$57- CAD and CAE	18MPE\$64- Industrial Automation
18MPE\$21- Energy Conservation and Management	18MPE\$13- Process Planning and Cost Estimation	18MPE\$41- Drone Technologies	18MPE\$46- Green Supply Chain Management	18MPE\$52- Design codes and Standards	18MPE\$58- Machine Learning for intelligent systems	

GOVERNMENT COLLEGE OF TECHNOLOGY, COIMBATORE – 641 013**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING - VERTICALS**

S.NO	VERTICAL I POWER ENGINEERING	VERTICAL II DRIVES AND ENERGY TECHNOLOGIES	VERTICAL III INSTRUMENTATION AND CONTROL	VERTICAL IV DIVERSIFIED COURSES FOR ELECTRICAL ENGINEERING	VERTICAL V ELECTRIC VEHICLE TECHNOLOGY
1	18EPE\$03 POWER SYSTEM ECONOMICS	18EPE\$14 SPECIAL MACHINES AND CONTROLLERS	18EPE\$10 POWER PLANT INSTRUMENTATION	18EPE\$22 OPTIMIZATION TECHNIQUES	18EPE\$30 ELECTRIC VEHICLE ARCHITECTURE
2	18EPE\$09 POWER SYSTEM STABILITY	18EPE\$23 ELECTRICAL MACHINE DESIGN	18EPE\$19 BIOMEDICAL INSTRUMENTATION	18EPE\$02 NEURAL AND FUZZY SYSTEMS	18EPE\$31 DESIGN OF MOTOR AND POWER CONVERTERS FOR ELECTRIC VEHICLES
3	18EPE\$05 HVDC TRANSMISSION SYSTEMS	18EPE\$20 INDUSTRIAL DRIVES AND CONTROL	18EPE\$01 PRINCIPLES OF VIRTUAL INSTRUMENTATION	18EPE\$08 AUTOMOTIVE ELECTRONICS FOR ELECTRICAL ENGINEERING	18EPE\$32 ELECTRIC VEHICLE DESIGN, MECHANICS AND CONTROL
4	18EPE\$06 FACTS CONTROLLERS	18EPE\$04 POWER QUALITY ENGINEERING	18EPE\$18 MEMS AND APPLICATIONS	18EPE\$11 DIGITAL SIGNAL PROCESSING AND PROCESSORS	18EPE\$33 DESIGN OF ELECTRIC VEHICLE CHARGING SYSTEM
5	18EPE\$07 ENERGY AUDITING AND MANAGEMENT	18EPE\$21 ENERGY STORAGE TECHNOLOGY	18EPE\$15 LOGIC AND DISTRIBUTED CONTROL SYSTEMS	18EPE\$12 COMPUTER SYSTEM ARCHITECTURE	18EPE\$34 TESTING OF ELECTRIC VEHICLES
6	18EPE\$17 SOLID STATE RELAYS	18EPE\$26 DISTRIBUTED GENERATION AND MICROGRID	18EPE\$25 MODERN CONTROL THEORY	18EPE\$13 PRINCIPLES OF EMBEDDED SYSTEMS	18EPE\$35 GRID INTEGRATION OF ELECTRIC VEHICLES
7	18EPE\$24 SMART GRID TECHNOLOGY	18EPE\$29 RENEWABLE ENERGY TECHNOLOGY	18EPE\$27 ELECTRONIC CIRCUIT DESIGN	18EPE\$28 ELECTRONIC SYSTEM DESIGN AND PRODUCTIZATION	18EPE\$36 INTELLIGENT CONTROL OF ELECTRIC VEHICLES
8	18EPE\$16 RESTRUCTURED POWER SYSTEMS				

GOVERNMENT COLLEGE OF TECHNOLOGY, COIMBATORE – 641 013**DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING - VERTICALS**

2018R Verticals

Vertical I High speed Communications	Vertical II RF Technologies	Vertical III Signal and Image processing	Vertical IV VLSI Design	Vertical V Bio Medical Technologies
18LPE\$17 AdHoc and Wireless Sensor networks	18LPE\$18 Satellite Communication	18LPE\$02 Speech Signal Processing	18LPE\$13 Low Power VLSI	18LPE\$51 Bio sensors
18LPE\$27 Wireless Communication Techniques	18LPE\$26- Microwave Integrated Circuits	18LPE\$12 Advanced Digital Signal Processing	18LPE\$45 Analog IC Design	18LPE\$52 Medical Instrumentation
18LPE\$28 High Speed Networks	18LPE\$34 Advanced Radiation Systems	18LPE\$15 Digital Image and Video Processing	18LPE\$46 Programming FPGA using HDLs	18LPE\$53 Medical imaging systems
18LPE\$29 Coding Theory and Secured Communication	18LPE\$35 Electromagnetic Interference and Compatibility	18LPE\$40 VLSI Signal Processing	18LPE\$47 ASIC Design	18LPE\$54 Bio Informatics for Bio Medical Engineers
18LPE\$30 Software Defined Networks (common to CSE)	18LPE\$36 RF Transceivers	18LPE\$41 Nonlinear Signal Processing	18LPE\$48 System on Chip Design	18LPE\$55 Bio telemetry and Telemedicine
18LPE\$31 Massive MIMO and mmwave systems	18LPE\$37 RF system Design	18LPE\$42 Radar Signal Processing	18LPE\$49 VLSI Testing and Design for Testability	18LPE\$56 Embedded systems in Medicine
18LPE\$32 Optical Communication & Networks	18LPE\$38 Smart Antennas	18LPE\$43 Computer Vision Algorithms and Applications	18LPE\$50 Design for Verification using UVM	18LPE\$57 Wearable Technologies
18LPE\$33 Evolution of 4G/5G Technologies	18LPE\$39 RFID System Design and Testing	18LPE\$44 Digital Signal Processors		18LPE\$58 Hospital safety and management

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DEPARTMENT OF PRODUCTION ENGINEERING - VERTICALS

PROFESSIONAL ELECTIVE COURSES: VERTICALS			
Vertical 1	Vertical 2	Vertical 3	Vertical 4
AUTOMATION	PRODUCT DESIGN AND DEVELOPMENT	MANUFACTURING PROCESSES	INDUSTRIAL ENGINEERING AND QUALITY CONTROL
18PPE\$01 Mechatronic Systems	18PPE\$02 Finite Element Techniques	18PPE\$03 Unconventional Manufacturing Processes	18PPE\$07 Statistical Quality Control and Reliability Engineering
18PPE\$04 CNC Technology	18PPE\$06 Robust Design	18PPE\$08 Advanced Welding Technology	18PPE\$12 Plant Layout and Material Handling
18PPE\$23 Robotics and Machine Vision System	18PPE\$09 Product Design and Process Engineering	18PPE\$16 Lean Manufacturing	18PPE\$13 Non Destructive Testing Techniques
18PPE\$25 Electronics Manufacturing Technology	18PPE\$10 Design for Manufacture and Assembly	18PPE\$17 Micro manufacturing Processes	18PPE\$14 Supply Chain Management
18PPE\$26 Smart Manufacturing	18PPE\$22 Computer Aided Design	18PPE\$19 Advanced Casting Technology	18PPE\$15 Production Management
18PPE\$27 Modern Control Technology	18PPE\$18 Theory of Metal Cutting	18PPE\$21 Green Manufacturing	18PPE\$20 Total Productive Maintenance
18PPE\$28 Intelligent Manufacturing Systems	18PPE\$30 Introduction to Composite Materials	18PPE\$24 Investment Casting	18PPE\$05 Power Plant Engineering
18PPE\$29 Image Processing in Manufacturing	18PPE\$31 Industrial Ergonomics	18PPE\$32 Surface Engineering and Tribology	18PPE\$11 Human Values and Professional Ethics II
-	-	-	18PPE\$33 Industrial Safety Engineering

GOVERNMENT COLLEGE OF TECHNOLOGY, COIMBATORE – 641 013

DEPARTMENT OF ELECTRONICS AND INSTRUMENTATION ENGINEERING - VERTICALS

Advanced Control	Applied Instrumentation	Health Care Instrumentation	Industrial Automation
18NPE\$32 Process Modeling and Simulation	18NPE\$17 Fiber Optics and Laser Instrumentation	18NPE\$21 Biomedical Instrumentation	18NPE\$45 PLC Programming
18NPE\$03 Computer Control of Processes	18NPE\$20 Power Plant Instrumentation	18NPE\$39 Bio Signal Processing	18NPE\$24 Robotics and its Applications
18NPE\$33 System Identification	18NPE\$22 Instrumentation and Control in Petro Chemical Industries	18NPE\$40 Medical Imaging	18NPE\$15 Industrial Internet of Things
18NPE\$34 Non Linear Control	18NPE\$18 Aircraft Instrumentation	18NPE\$41 Medical Image Processing	18NPE\$46 Data Analytics for IoT
18NPE\$35 Adaptive Control	18NPE\$26 Automotive Instrumentation	18NPE\$42 Medical Robotics	18NPE\$47 IoT for Smart Cities
18NPE\$36 Model Based Control	18NPE\$11 Safety Instrument Systems	18NPE\$43 Diagnosis and Therapeutic Equipment	18NPE\$48 Building Automation
18NPE\$37 Machine Monitoring System	18NPE\$38 Electrical Vehicle Technology	18NPE\$44 Physiological Control Systems	18NPE\$49 Smart Farming

GOVERNMENT COLLEGE OF TECHNOLOGY, COIMBATORE – 641 013
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING - VERTICALS

Verticals	Course Code	Course Name
Artificial Intelligence	18SPE\$19	Knowledge Representation
	18SPE\$20	Ethics and AI
	18SPE\$21	Deep Learning
	18SPE\$05	Natural Language Processing
	18SPE\$22	Game Theory
	18SPE\$23	Soft Computing
	18SPE\$24	Cognitive Science
Full Stack Development	18SPE\$25	Web Application Security
	18SPE\$26	Dev-ops
	18SPE\$01	Introduction to Web Technology
	18SPE\$07	Cloud Engineering
	18SPE\$27	Principles of Programming Languages
	18SPE\$28	UI & UX design
	18SPE\$29	App Development
Data Science and Analytics	18SPE\$12	Big Data Analytics
	18SPE\$17	Data Warehousing and Data Mining
	18SPE\$08	Computer Vision
	18SPE\$21	Deep Learning
	18SPE\$30	Recommender Systems
	18SPE\$31	Exploratory Data Analytics
	18SPE\$32	Image and Video Analytics
Cyber Security	18SPE\$33	Modern Cryptography
	18SPE\$34	Network Security
	18SPE\$35	Security and Privacy in cloud
	18SPE\$36	Crypto-currency and Blockchain Technologies
	18SPE\$37	Ethical Hacking
	18SPE\$38	Digital and Mobile Forensics
	18SPE\$39	Social Network Security

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DEPARTMENT OF INFORMATION TECHNOLOGY - VERTICALS

Vertical I	Vertical II	Vertical III	Vertical IV	Vertical V	Vertical VI
Data Science	Full Stack Development for IT	Cloud Computing and Data Centre Technologies	Cyber Security and Data Privacy	Creative Media	Artificial Intelligence and Machine Learning
18IPE\$31 - Exploratory Data Analysis	18IPE\$10 - Cloud Computing	18IPE\$10 - Cloud Computing	18IPE\$51 -Ethical Hacking	18IPE\$20 - Virtual and Augmented Reality	18IPE\$65 - Knowledge Engineering
18IPE\$32 - Recommender Systems	18IPE\$39 -App Development	18IPE\$18 - Virtualization Techniques	18IPE\$52 -Digital and Mobile Forensics	18IPE\$58 - Multimedia and Animation	18IPE\$14* - Soft Computing and its Applications
18IPE\$33 - Neural Networks and Deep Learning	18IPE\$40 - Cloud Services Management	18IPE\$46 - Cloud Services Management	18IPE\$53 - Social Network Security	18IPE\$59 - Video Creation and Editing	18IPE\$66 - Neural Networks and Deep Learning
18IPE\$34 - Text and Speech Analysis	18IPE\$41 - UI and UX Design	18IPE\$47 - Data Warehousing	18IPE\$54 -Modern Cryptography	18IPE\$60 - UI and UX Design	18IPE\$67 - Text and Speech Analysis
18IPE\$35 - Business Analytics	18IPE\$42 - Software Testing and Automation	18IPE\$48 - Storage Technologies	18IPE\$55 - Engineering Secure software systems	18IPE\$61 - Digital marketing	18IPE\$68 - Optimization Techniques and Applications
18IPE\$36 - Image and video analytics	18IPE\$43 -Web Application Security	18IPE\$28 - Software Defined Networking	18IPE\$56 - Cryptocurrency and Blockchain Technologies	18IPE\$62 - Visual Effects	18IPE\$69 - Game Theory
18IPE\$37 - Computer Vision and Applications	18IPE\$44 - Dev-ops	18IPE\$49 - Stream Processing	18IPE\$57 - Information Security	18IPE\$63 - Game Development	18IPE\$70 - Cognitive Science
18IPE\$38 - Big Data Science and Analytics	18IPE\$45 - Principles of Programming Languages	18IPE\$50 - Security and Privacy in Cloud	18IPE\$50 - Security and Privacy in Cloud	18IPE\$64 - Multimedia Data Compression and Storage	18IPE\$71 - Ethics And AI

GOVERNMENT COLLEGE OF TECHNOLOGY, COIBATORE – 641 013
DEPARTMENT OF INDUSTRIAL BIOTECHNOLOGY - VERTICALS

S. No.	Vertical I Medical Biotechnology	Vertical II rDNA Technology	Vertical III Bioprocess Technology	Vertical IV Quality and Regulatory Affairs	Vertical V Biosciences
1.	18BPE\$16 Immunotechnology	18BPE\$13 Genomics and Proteomics	18BPE\$28 Aspects of Biochemical Engineering	18BPE\$34 Clinical trials and health care policies in Biotechnology	18BPE\$42 Human Anatomy and Physiology
2.	18BPE\$25 Neurobiology and cognitive sciences	18BPE\$20 Metabolic Engineering	18BPE\$29 Fermentation Technology	18BPE\$35 Biotechnological products and its validation	18BPE\$43 Bioethics
3.	18BPE\$10 Molecular Pathogenesis	18BPE\$07 Plant Biotechnology	18BPE\$04 Food Process Engineering	18BPE\$36 Quality assurance and quality control in Biotechnology	18BPE\$44 Biomass and Bioenergy
4.	18BPE\$08 Cancer Biology	18BPE\$12 Animal Biotechnology	18BPE\$30 Bioreactor design and scale up process	18BPE\$37 Entrepreneurship and patent design	18BPE\$09 Environmental Biotechnology
5.	18BPE\$17 Biopharmaceutical Technology	18BPE\$21 Protein Engineering	18BPE\$31 Bioreactor consideration for recombinant products	18BPE\$38 Intellectual property rights in Biotechnology	18BPE\$02 Biopolymer technology
6.	18BPE\$19 Tissue Engineering	18BPE\$06 Marine Biotechnology	18BPE\$32 Bio process control and instrumentation	18BPE\$39 Biosafety and Hazard management	18BPE\$11 Nanobiotechnology
7.	18BPE\$26 Molecular forensics	18BPE\$22 Pharmacogenomics	18BPE\$33 Bioprocess modelling and simulation	18BPE\$40 Conservation economics	18BPE\$45 Biomass conversion and Biorefinery
8.	18BPE\$27 Medicinal chemistry	18BPE\$23 Genetics	18BPE\$18 Bioprocess economics and plant design	18BPE\$41 Chemical Process safety	18BPE\$46 Introduction to Biostatistics