



**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**

**Curriculum**

**for**

**B.Tech Degree**

**Semesters III to VIII**

**2016**

**Biotechnology/Biotechnology & Biochemical Engineering**

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

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**BRANCH: *Biotechnology/Biotechnology & Biochemical Engineering*****SEMESTER - 3**

<b>Course Code</b>	<b>Course Name</b>	<b>L-T-P</b>	<b>Credits</b>	<b>Exam Slot</b>
MA201	Linear Algebra & Complex Analysis	3-1-0	4	A
BT201	Fluid Flow and Particle Technology	3-1-0	4	B
BT203	Concepts In Biochemical Engineering	4-0-0	4	C
BT205	Bioprocess Calculations	3-1-0	4	D
BT207	Microbiology	3-0-0	3	E
HS200/ HS210	Business Economics/Life Skills	3-0-0/ 2-0-2	3	F
BT231	Microbiology Lab	0-0-3	1	S
BT233	Fluid Flow and Particle Technology Lab	0-0-3	1	T

**Total Credits = 24****Hours: 28/29****Cumulative Credits= 71****SEMESTER - 4**

<b>Course Code</b>	<b>Course Name</b>	<b>L-T-P</b>	<b>Credits</b>	<b>Exam Slot</b>
MA206	Probability & Statistics and Numerical Methods	3-1-0	4	A
BT202	Bioprocess Heat Transfer	3-1-0	4	B
BT204	Industrial Bioprocessing	4-0-0	4	C
BT206	C++ Programming	3-0-0	3	D
BT208	Principles of Biochemistry	3-0-0	3	E
HS210/ HS200	Life Skills/Business Economics	2-0-2/ 3-0-0	3	F
BT232	Biochemistry Lab	0-0-3	1	S
BT234	Instrumental Methods of Analysis Lab	0-0-3	1	T

**Total Credits = 23****Hours 28/27****Cumulative Credits= 94**

**BRANCH: *Biotechnology/Biotechnology & Biochemical Engineering*****SEMESTER - 5**

<b>Course Code</b>	<b>Course Name</b>	<b>L-T-P</b>	<b>Credits</b>	<b>Exam Slot</b>
BT301	Mass Transfer Operations	3-1-0	4	A
BT303	Chemical and Biological Reaction Engineering	3-0-0	3	B
BT305	Cellular and Molecular Biology	3-0-0	3	C
BT307	Bioprocess Instrumentation	3-0-0	3	D
BT309	Enzyme Engineering and Technology	3-0-0	3	E
	<b>Elective 1</b>	3-0-0	3	F
BT341	Design Project	0-1-2	2	S
BT331	Biochemical Engineering Lab	0-0-3	1	T
BT333	Software Lab	0-0-3	1	U

**Total Credits = 23****Hours: 28****Cumulative Credits= 117**

- Elective 1:-**
1. BT361 Animal and Plant Cell Biotechnology
  2. BT363 Metabolic Engineering and Synthetic Biology
  3. BT365 Proteomics and Protein Engineering
  4. BT367 Tissue Engineering and Stem Cells

**BRANCH: *Biotechnology/Biotechnology & Biochemical Engineering*****SEMESTER - 6**

Course Code	Course Name	L-T-P	Credits	Exam Slot
BT302	Transport Phenomena in Biological Systems	4-0-0	4	A
BT304	Downstream Processing	3-0-0	3	B
BT306	Bioprocess Engineering	3-0-0	3	C
BT308	Bioreactor Analysis and Design	3-0-0	3	D
HS300	Principles of Management	3-0-0	3	E
	<b>Elective 2</b>	3-0-0	3	F
BT332	Heat and Mass Transfer Lab	0-0-3	1	S
BT334	Downstream Processing Lab	0-0-3	1	T
BT352	Comprehensive Exam	0-1-1	2	U

**Total Credits = 23****Hours: 27****Cumulative Credits= 140****Elective 2:-**

1. BT362 Sustainable Energy Processes
2. BT364 Bio refinery Engineering
3. BT366 Bioremediation Technology
4. BT368 Genetic Engineering

**BRANCH: *Biotechnology/Biotechnology & Biochemical Engineering*****SEMESTER - 7**

<b>Course Code</b>	<b>Course Name</b>	<b>L-T-P</b>	<b>Credits</b>	<b>Exam Slot</b>
BT401	Process Dynamics and Control	4-0-0	4	A
BT403	Bioinformatics	3-0-0	3	B
BT405	Environmental Engineering	3-0-0	3	C
BT407	Bioenergy Engineering	3-0-0	3	D
BT409	Environmental Biotechnology	3-0-0	3	E
	<b>Elective 3</b>	3-0-0	3	F
BT451	Seminar & Project Preliminary	0-1-4	2	S
BT431	Reaction Engineering and Process Control Lab	0-0-3	1	T

**Total Credits = 22****Hours: 27****Cumulative Credits= 162****Elective 3:-**

1. BT461 Design of Biological Wastewater Treatment Systems
2. BT463 Bioprocess Optimization Modelling and Simulation
3. BT465 Advanced Separation Processes
4. BT467 Biopharmaceutical Technology

**BRANCH: *Biotechnology/Biotechnology & Biochemical Engineering***

**SEMESTER - 8**

<b>Course Code</b>	<b>Course Name</b>	<b>L-T-P</b>	<b>Credits</b>	<b>Exam Slot</b>
BT402	Bioprocess Plant Design and Safety	3-0-0	3	A
BT404	Bioprocess Quality Control	3-0-0	3	B
	<b>Elective 4</b>	3-0-0	3	C
	<b>Elective 5 (Non Departmental)</b>	3-0-0	3	D
BT492	Project		6	S

**Total Credits = 18**

**Hours: 30**

**Cumulative Credits= 180**

**Elective 4:-**

1. BT462 Biomaterials Engineering
2. BT464 Food Process Technology
3. BT466 Nano biotechnology
4. BT468 Entrepreneurship, IPR and Biosafety

## **ELECTIVE 5 (NON DEPARTMENTAL ELECTIVE COURSES)**

*(Note:- If a student has studied or chosen the elective course given within the brackets then the corresponding ND elective cannot be chosen)*

1. AO482 FLIGHT AGAINST GRAVITY
2. AE482 INDUSTRIAL INSTRUMENTATION
3. AE484 INSTRUMENTATION SYSTEM DESIGN
4. AU484 MICROPROCESSOR AND EMBEDDED SYSTEMS
5. AU486 NOISE, VIBRATION AND HARSHNESS
6. BM482 BIOMEDICAL INSTRUMENTATION
7. BM484 MEDICAL IMAGING & IMAGE PROCESSING TECHNIQUES
8. CH482 PROCESS UTILITIES AND PIPE LINE DESIGN
9. CH484 FUEL CELL TECHNOLOGY
10. CE482 ENVIRONMENTAL IMPACT ASSESSMENT
11. CE484 APPLIED EARTH SYSTEMS
12. CE486 GEO INFORMATICS FOR INFRASTRUCTURE MANAGEMENT
13. CE488 DISASTER MANAGEMENT
14. CE494 ENVIRONMENT HEALTH AND SAFETY
15. CS482 DATA STRUCTURES
16. CS484 COMPUTER GRAPHICS
17. CS486 OBJECT ORIENTED PROGRAMMING
18. CS488 C # AND .NET PROGRAMMING
19. EE482 ENERGY MANAGEMENT AND AUDITING
20. EE484 CONTROL SYSTEMS
21. EE486 SOFT COMPUTING
22. EE488 INDUSTRIAL AUTOMATION
23. EE494 INSTRUMENTATION SYSTEMS

24. EC482	BIOMEDICAL ENGINEERING
25. FT482	FOOD PROCESS ENGINEERING (BT 464 FOOD PROCESS TECHNOLOGY)
26. FT484	FOOD STORAGE ENGINEERING
27. FT486	FOOD ADDITIVES AND FLAVOURING
28. IE482	FINANCIAL MANAGEMENT
29. IE484	INTRODUCTION TO BUSINESS ANALYTICS
30. IE486	DESIGN AND ANALYSIS OF EXPERIMENTS
31. IE488	TOTAL QUALITY MANAGEMENT
32. IC482	BIOMEDICAL SIGNAL PROCESSING
33. IT482	INFORMATION STORAGE MANAGEMENT
34. MA482	APPLIED LINEAR ALGEBRA
35. MA484	OPERATIONS RESEARCH
36. MA486	ADVANCED NUMERICAL COMPUTATIONS
37. MA488	CRYPTOGRAPHY
38. ME484	FINITE ELEMENT ANALYSIS
39. ME482	ENERGY CONSERVATION AND MANAGEMENT
40. ME471	OPTIMIZATION TECHNIQUES
41. MP482	PRODUCT DEVELOPMENT AND DESIGN
42. MP469	INDUSTRIAL PSYCHOLOGY & ORGANIZATIONAL BEHAVIOUR
43. MP484	PROJECT MANAGEMENT
44. MR482	MECHATRONICS
45. FS482	RESPONSIBLE ENGINEERING
46. SB482	DREDGERS AND HARBOUR CRAFTS
47. HS482	PROFESSIONAL ETHICS