Academic Regulations 2009 for B. Tech (Regular)
(Effective for the students admitted into I year
from the Academic Year 2009-2010 onwards)

1. Award of B.Tech. Degree

A student will be declared eligible for the award of the B.Tech. Degree if he fulfils the following academic regulations:

i. Pursue a course of study for not less than four academic years and in not more than eight academic years.

ii. Register for 220 credits and secure all 220credits

2. Students, who fail to fulfil all the academic requirements for the award of the degree within eight academic years from the year of their admission, shall forfeit their seat in B.Tech course and their admission is cancelled.

3. Courses of study

The courses of study are offered at present for specialization for the B. Tech. Course:

S.No.	Branch
1.	Aeronautical Engineering.
2.	Biotechnology.
3.	Civil Engineering.
4.	Computer Science and Engineering.
5.	Computer Science and System Engineering.
6.	Electrical and Electronics Engineering.
7.	Electronics and Communication Engineering.
8.	Electronics and Computer Engineering.
9.	Electronics and Control Engineering.
10.	Electronics and Instrumentation Engineering.
11.	Information Technology.
12.	Mechanical Engineering.

and any other course as approved by the authorities of the University from time to time.

4. Credits

	I Year		Semester	
	Periods / Week	Credits	Periods / Week	Credits
Theory	03	06	03	04
	02	04	--	--
Practical	03	04	03	02
Drawing	06	06	03 06	02 04
Seminar	--	--	6	02
Project	--	--	15	10

5. Distribution and Weightage of Marks

i. The performance of a student in each semester / I year shall be evaluated subject –wise with a maximum of 100 marks for theory and 75 marks for practical subject. In addition seminar and project work shall be evaluated for 50 and 200 marks respectively.

ii. For theory subjects the distribution shall be 30 marks for Internal Evaluation and 70 marks for the End-Examination.

iii. For theory subjects, during the semester there shall be Two midterm examinations. Each mid term examination consists of objective paper for 10 marks and subjective paper for 20 marks with duration of 1hour 50 minutes (20 minutes for objective and 90 minutes for subjective paper).

Objective paper is set for 20 bits for 10 marks. Subjective paper shall contain 5 questions of which student has to answer 3 questions evaluated* for 20 marks. First mid term examination shall be conducted for I-IV units of syllabus and second mid term examination shall be conducted for V -VIII units. The total marks secured by the student in each mid term examination for 30 marks is considered and the better of the two mid term examinations shall be taken as the final sessional marks secured by each candidate in the subject.

However for first year, there shall be Three midterm examinations as in the above pattern and the average marks of the

best two midterm examinations secured in each subject shall be considered as final marks for sessionals.

*Note 1: The subjective paper shall contain 5 questions of equal weightage of 10 marks and the marks obtained for 3questions shall be condensed to 20 marks, any fraction rounded off to the next higher mark

*Note 2: The mid term examination shall be conducted first by distribution of the Objective paper simultaneously marking the attendance, after 20minutes the answered objective paper is collected back. The student is not allowed to leave the examination hall. Then the descriptive question paper and the answer booklet are distributed. After 90minutes the answered booklets are collected back.

iv. For practical subjects there shall be a continuous evaluation during the semester for 25 sessional marks and 50 end examination marks. Day-to-day work in the laboratory shall be evaluated for 25 marks by the concerned laboratory teacher based on the report of experiments/jobs. The end examination shall be conducted by the laboratory teacher and another examiner.

v. For the subject having design and / or drawing, such as Engineering Drawing, Machine Drawing and estimation, the distribution shall be 30 marks for internal evaluation and 70 marks for end examination. The Internal evaluation for sessionals will be 15 marks for day-to-day work in the class that shall be evaluated by the concerned subject teacher based on the reports/submissions prepared in the class. And there shall be two midterm exams in a Semester for a duration of 2hrs each, evenly distributed over the syllabi for 15 marks and the better of the two shall be considered as internal test marks. The sum of day to day evaluation and the internal test marks will be the final sessionals for the subject. However in the I year class, there shall be three midterm exams and the average of best two will be taken into consideration.

vi. There shall be a seminar presentation in IV year II Semester. For the seminar, the student shall collect the information on a specialized topic and prepare a technical report, showing his understanding over the topic, and submit to the department before presentation. The report and the presentation shall be evaluated by the Departmental committee consisting of Head of the

department, seminar supervisor and a senior faculty member. The seminar shall be evaluated for 50 marks and marks shall be submitted to the University along with internal marks. There shall be no external examination for seminar.

vii. Out of a total of 200 marks for the project work, 60 marks shall be for Internal Evaluation and 140 marks for the End Semester Examination (Viva-voce). The viva-voce shall be conducted by a committee consisting of HOD, Project Supervisor and an External Examiner nominated by the University. The evaluation of project work shall be conducted at the end of the IV year. The Internal Evaluation shall be made by the departmental committee, on the basis of two seminars given by each student on the topic of his project.

viii. Laboratory marks and the sessional marks awarded by the College are not final. They are subject to scrutiny and scaling by the University wherever necessary. In such cases, the sessional and laboratory marks awarded by the College will be referred to a Committee. The Committee will arrive at a scaling factor and the marks will be scaled as per the scaling factor. The recommendations of the Committee are final and binding.

ix. The laboratory records and internal test papers shall be preserved in the respective institutions as per the University norms and shall be produced to the Committees of the University as and when the same are asked for.

6. Attendance Requirements:

i. A student shall be eligible to appear for University examinations if he acquires a minimum of 75% of attendance in aggregate of all the subjects in a semester/ I year.

ii. **Shortage of Attendance below 65% in aggregate shall in <u>NO</u> case be condoned**.

iii. Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in each semester or I year may be granted by the College Academic Committee.

iv. Students whose shortage of attendance is not condoned in any semester / I year are not eligible to take their end examination of that class and their registration shall stand cancelled.

v. A student will not be promoted to the next semester unless he satisfies the attendance requirements of the present semester / I

year, as applicable. They may seek readmission for that semester / I year when offered next.

vi. A stipulated fee shall be payable towards condonation of shortage of attendance to the University.

7. Minimum Academic Requirements:

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in item no.**6**

i. A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory, practical, design, drawing subject or project if he secures not less than 35% of marks in the end examination and a minimum of 40% of marks in the sum total of the internal evaluation and end examination taken together. In the Seminar he should secure 40%.

ii. A student shall be promoted from II to III year only if he fulfils the academic requirement of securing **40** credits from

a. One regular and one supplementary examinations of I year.
b. One regular examination of II year I semester

irrespective of whether the candidate takes the end examination or not as per the normal course of study.

iii. A student shall be promoted from third year to fourth year only if he fulfils the academic requirements of securing **68 c**redits from the following examinations,

a. Two regular and two supplementary examinations of I year.
b. Two regular and one supplementary examinations of II year I semester.
c. One regular and one supplementary examinations of II year II semester.
d. One regular examination of III year I semester.

irrespective of whether the candidate takes the end examination or not as per the normal course of study.

And in case of getting detained for want of credits by sections ii and iii above, the student may make up the credits through supplementary exams of the above exams before the date of class work commencement of Third or Fourth year I semester respectively.

iv. A student shall register and put up minimum attendance in all 220 credits and earn all the 220 credits. Marks obtained in all 220 credits shall be considered for the calculation of percentage of marks obtained.

v. Students who fail to earn 220 credits as indicated in the course structure within eight academic years from the year of their admission shall forfeit their seat in B.Tech course and their admission shall stand cancelled.

8. Course pattern:

i. The entire course of study is of four academic years. The first year shall be on yearly pattern and the second, third and fourth years on semester pattern.

ii. A student eligible to appear for the end examination in a subject, but absent at it or has failed in the end examination may appear for that subject at the next supplementary examination offered.

iii. When a student is detained due to lack of credits / shortage of attendance he may be re-admitted when the semester is offered after fulfilment of academic regulations, whereas he continues to be in the academic regulations he was first admitted.

9. Transitory Regulations:

Candidates who have been detained for want of attendance or not fulfilled academic requirements or who have failed after having undergone the course in earlier regulations or have discontinued and wish to continue the course are eligible for admission into the unfinished semester from the date of commencement of class work with the same or equivalent subjects as and when subjects are offered, subject to Section **2**. and they continues to be in the academic regulations they were first admitted.

10. With–holding of results:

If the candidate has any dues not paid to the university or if any case of indiscipline or malpractice is pending against him, the result of the candidate shall be withheld and he will not be allowed / promoted into the next higher semester. The issue of degree is liable to be withheld in such cases.

11. Award of Class:

After a student has satisfied the requirements prescribed for the completion of the program and is eligible for the award of B.

Tech. Degree he shall be placed in one of the following four classes:

Class Awarded	% of marks to be secured	
First Class with Distinction	70% and above	From the aggregate marks secured for the best 220 Credits.
First Class	Below 70% but not less than 60%	
Second Class	Below 60% but not less than 50%	
Pass Class	Below 50% but not less than 40%	

(The marks in internal evaluation and end examination shall be shown separately in the marks memorandum)

12. Minimum Instruction Days:

The minimum instruction days including exams for each semester / I year shall be 90/180 days respectively.

13. There shall be no branch transfers after the completion of admission process.

14. There shall be no place transfer within the Constituent Colleges.

15. General:

i. **The academic regulations should be read as a whole for purpose of any interpretation**.

ii. **Malpractices rules- nature and punishments is appended**

iii. **Where the words "he", "him", "his", occur in the regulations, they include "she", "her", "hers".**

iv. **In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Vice-Chancellor is final.**

v. **The University may change or amend the academic regulations or syllabi at any time and the changes or amendments shall be made applicable to all the students on roles with effect from the dates notified by the University.**

--*

ACADEMIC REGULATIONS FOR B. TECH. (LATERAL ENTRY SCHEME)

(Effective for the students getting admitted into II year through Lateral Entry Scheme from the Academic Year 2010-2011 and onwards)

1. Award of B.Tech. Degree

A student admitted in LES will be declared eligible for the award of the B. Tech Degree if he fulfils the following academic regulations:

i. Pursue a course of study for not less than three academic years and in not more than six academic years.

ii. Register for 168 credits and secure all 168 credits from II to IV year of Regular B.Tech. program

2. Students, who fail to fulfil the requirement for the award of the degree in six consecutive academic years from the year of admission, shall forfeit their seat.

3. The regulations **3** to **6** are to be adopted as that of B. Tech. (Regular).

7. Minimum Academic Requirements :

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in item no.**6**

i. A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory, practical, design, drawing subject or project if he secures not less than 35% of marks in the end examination and a minimum of 40% of marks in the sum total of the internal evaluation and end examination taken together. For the Seminar he should secure 40% in the internal evaluation.

ii. A student shall be promoted from third year to fourth year only if he fulfils the academic requirements of 42 credits from the following examinations.

a. Two regular and one supplementary examinations of II year I semester.

b. One regular and one supplementary examinations of II year II semester.

c. One regular examination of III year I semester.

irrespective of whether the candidate takes the end examination or not as per the normal course of study.

and in case of getting detained for want of credits the student may make up the credits through supplementary exams of the above

exams before the date of class work commencement of Fourth year I semester.

8. Course Pattern

i. The entire course of study is three academic years on semester pattern.

ii. A student eligible to appear for the end examination in a subject, but absent at it or has failed in the end examination may appear for that subject at the next supplementary examination offered.

iii. When a student is detained due to lack of credits / shortage of attendance he may be re-admitted when the semester is offered after fulfilment of academic regulations, whereas he continues to be in the academic regulations he was first admitted.

9. The regulations **9** to **10** are to be adopted as that of B. Tech. (Regular).

11. Award of Class:

After a student has satisfied the requirements prescribed for the completion of the program and is eligible for the award of B. Tech. Degree he shall be placed in one of the following four classes:

First Class with Distinction	70% and above	From the aggregate marks secured for 168 Credits. (i.e. II year to IV year)
First Class	Below 70% but not less than 60%	
Second Class	Below 60% but not less than 50%	
Pass Class	Below 50% but not less than 40%	

(The marks in internal evaluation and end examination shall be shown separately in the marks memorandum)

12.The regulations **12** to **15** are to be adopted as that of B. Tech. (Regular). All other regulations as applicable for B. Tech. Four-year degree course (Regular) will hold good for B. Tech. (Lateral Entry Scheme)

RULES FOR DISCIPLINARY ACTION FOR MALPRACTICES / IMPROPER CONDUCT IN EXAMINATIONS

	Nature of Malpractices/Improper conduct	Punishment
	If the candidate:	
1. (a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination)	Expulsion from the examination hall and cancellation of the performance in that subject only.
(b)	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him.
2.	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate

	the examination (theory or practical) in which the candidate is appearing.	has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester/year. The Hall Ticket of the candidate is to be cancelled and sent to the University.
3.	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred and forfeits the seat. The performance of the original candidate who has been impersonated, shall be cancelled in all the subjects of the examination (including practicals and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he will be handed over to the police and a case is registered against him.
4.	Smuggles in the Answer book or additional sheet or takes out or	Expulsion from the examination hall and

	arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5.	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject.
6.	Refuses to obey the orders of the Chief Superintendent/Assistant – Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words,	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The candidates also are debarred and forfeit their seats.

	either spoken or written or by signs or by visible representation, assaults the officer-in-charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	In case of outsiders, they will be handed over to the police and a police case is registered against them.
7.	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
8.	Possess any lethal weapon or	Expulsion from the

	firearm in the examination hall.	examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat.
9.	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the colleges expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them.
10.	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and

		all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year.
11.	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester/year examinations.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the University for further action to award suitable punishment.	

Malpractices identified by squad or special invigilators

1. Punishments to the candidates as per the above guidelines.
2. Punishment for institutions : (if the squad reports that the college is also involved in encouraging malpractices)
   (i) A show cause notice shall be issued to the college.
   (ii) Impose a suitable fine on the college.

Shifting the examination centre from the college to another college for a specific period of not less than one year.

****

JAWAHARLAL NEHRU
TECHNOLOGICAL UNIVERSITY ANANTAPUR

IV B.Tech. – II Semester (E.C.E)

S. No.	Group	Subject	L	T	P	C P
01.	9A04801	Cellular & Mobile Communications	3	1	0	4
02.	9A04802	Digital Image Processing	3	1	0	4
03.	9A04803 9A04804 9A05709	**Elective – III** 1. Satellite Communications 2. Spread Spectrum Communications 3. Information Security	3	1	0	4
04.	9A04805 9A04806 9A04807	**Elective – IV** 1. Adaptive Filter Theory 2.Wireless Communications & Networks 3. Data Communications	3	1	0	4
05.	9A04808	Seminar	0	0	0	2
06.	9A04809	Project	--	--	--	10
		contact periods / week	12	04	0	
			Total/Week 16			
Total Credits (4Theory + Seminar + Project Work)						28

JAWAHARLAL NEHRU
TECHNOLOGICAL UNIVERSITY ANANTAPUR

Electronics and Communication Engineering
(9A04801) CELLULAR & MOBILE COMMUNICATIONS

B.Tech IV-II Sem. (E.C.E.)	T	P	C
	4	0	4

UNIT I
CELLULAR MOBILE RADIO SYSTEMS:
Introduction to Cellular Mobile system, performance criteria, uniqueness of mobile radio environment, operation of cellular systems, Hexagonal shaped cells, Analog and Digital Cellular systems.

UNIT II
ELEMENTS OF CELLULAR RADIO SYSTEM DESIGN:
General description of the problem, concept of frequency channels, Co-channel Interference Reduction Factor, desired C/I from a normal case in a Omni directional Antenna system, Cell splitting, consideration of the components of cellular system.

UNIT III
INTERFERENCE:
Introduction to Co-channel interference, real time co-channel interference, Co-channel measurement, design of Antenna system, Antenna parameters and their effects, diversity receiver, non-co-channel interference-different types.

UNIT IV
CELL COVERAGE FOR SIGNAL AND TRAFFIC:
Signal reflections in flat and hilly terrain, effect of human made structures, phase difference between direct and reflected paths, constant standard deviation, straight line path loss slope, general formula for mobile propagation over water and flat open area, near and long distance propagation antenna height gain, form of a point to point model.

UNIT V

CELL SITE AND MOBILE ANTENNAS:
Sum and difference patterns and their synthesis, Omni directional antennas, directional antennas for interference reduction, space diversity antennas, umbrella pattern antennas, minimum separation of cell site antennas, high gain antennas.

UNIT VI
FREQUENCY MANAGEMENT AND CHANNEL ASSIGNMENT:
Numbering and grouping, setup access and paging channels channel assignments to cell sites and mobile units, channel sharing and borrowing, sectorization, overlaid cells, non fixed channel assignment.

UNIT VII
HANDOFF:
Handoff, dropped calls and cell splitting, types of handoff, handoff invitation, delaying handoff, forced handoff, mobile assigned handoff. Intersystem handoff, cell splitting, micro cells, vehicle locating methods, dropped call rates and their evaluation.

UNIT VIII
DIGITAL CELLULAR NETWORKS:
GSM architecture, GSM channels, multiplex access scheme, TDMA, CDMA.

TEXT BOOKS:
1. Mobile cellular telecommunications-W .C. Y. Lee, Tata Mc-Graw Hill, 2nd Edition, 2006.
2. Wireless communications-Theodore. S. Rapport, Pearson Education, 2nd Edn., 2002.

REFERENCES:
1. Principles of Mobile communications-Gordon L. Stuber, Springer International 2nd Edition, 2007.
2. Wireless and Mobile Communications-Lee Mc Graw Hills, 3rd Edition, 2006.
3. Wireless communications and Networking-Jon W.Mark and Weihua Zhqung, PHI, 2005.
4. Wireless communication Technology-R.Blake, Thompson Asia Pvt.Ltd., 2004.

JAWAHARLAL NEHRU
TECHNOLOGICAL UNIVERSITY ANANTAPUR

Electronics and Communication Engineering
(9A04802) DIGITAL IMAGE PROCESSING

B.Tech IV-II Sem. (E.C.E.)	**T**	**P**	**C**
	4	**0**	**4**

UNIT-I
DIGITAL IMAGE FUNDAMENTALS:
Image Sensing and Acquisition, Image Sampling & quantization, some basic Relationships between pixels. Mathematical tools used in digital image processing – array Vs matrix operations, linear Vs non linear operations, arithmetic operations, set and logical operations, spatial operations, vector and matrix operations, Probabilistic methods.

UNIT-II
IMAGE TRANSFORMS:
2D-DFT and properties, Walsh Transform, Hadamard Transform, Discrete cosine Transform, Haar-Transform, Slant Transform, KL transform, comparison of different image transforms.

UNIT-III
IMAGE ENHANCEMENT IN THE SPATIAL DOMAIN:
Basic Intensity transformations functions, histogram Processing, fundamentals of Spatial Filtering, Smoothing Spatial filters, Sharpening spatial filters, Combining spatial enhancement methods.

UNIT-IV
IMAGE ENHANCEMENT IN FREQUENCY DOMAIN:
Basics of filtering in frequency domain, additional characteristics of the frequency domain, correspondence between filtering in the spatial and frequency domains. Image smoothing using frequency domain filters, image sharpening using frequency domain filters – Gaussian High pass filters, Laplacian in the frequency domain, Homomorphic filtering.

UNIT-V
IMAGE DEGRADATION / RESTORATION:

Noise models, Restoration in the presence of Noise only-spatial filtering, - mean, order- statistic and adaptive filters, Estimating the Degradation function, Inverse filtering, Weiner filtering, Constrained Least squares filtering.

UNIT-VI
IMAGE SEGMENTATION:
Point, line and edge Detection, Thresholding, Region based segmentation, the use of motion in segmentation.

UNIT-VII
IMAGE COMPRESSION:
Need for Image compression, Classification of Redundancy in Images, Image compression models, Classification of image compression schemes, Run length coding, arithmetic coding, Block truncation coding, Dictionary based compression, transform based compression, Image compression standards, Scalar quantization, vector quantization.

UNIT-VIII
COLOR IMAGE PROCESSING:
Color models, pseudo color image processing, color transformations, Smoothing and sharpening, image segmentation based on color.

TEXT BOOKS:
1. Digital Image Processing-R. C .Gonzalez & R.E. Woods, Addison Wesley/Pearson education, 3rd Edition, 2010.
2. Digital Image processing– S jayaraman, S Esakkirajan, T Veerakumar, Tata McGraw Hill.

REFERENCES:
1. Digital Image processing using MATLAB-Rafael C. Gonzalez, Richard E woods and Steven L.Eddins, Tata McGraw Hill, 2010.
2. Fundamentals of Digital Image processing-A .K. Jain, PHI.

JAWAHARLAL NEHRU
TECHNOLOGICAL UNIVERSITY ANANTAPUR

Electronics and Communication Engineering
(9A04803) SATELLITE COMMUNICATIONS
(ELECTIVE – III)

B.Tech IV-II Sem. (E.C.E.)	**T**	**P**	**C**
	4	**0**	**4**

UNIT-I
INTRODUCTION:
Origin of satellite communications, Historical background, basic concepts of satellite communications, frequency allocations for satellite services, applications, future trends of satellite communications.

UNIT-II
ORBITAL MECHANICS AND LAUNCHERS:
Orbital Mechanics look angle determination, orbital perturbations, orbit determination, launches and launch vehicles, orbital effects in communication systems performance.

UNIT-III
SATELLITE SUBSYSTEMS:
Attitude and orbital control system, Telemetry, Tracking, command and monitoring, power systems, communication subsystems, satellite antenna equipment reliability and space qualification.

UNIT-IV
SATELLITE LINK DESIGN:
Basic transmission theory, system noise temperature and G/T ratio, design of down links, uplink design, design of satellite links for specified C/N, system design example.

UNIT-V
MULTIPLE ACCESS:
Frequency division multiple access (FDMA) Intermodulation, calculation of C/N, Time Division multiple access (TDMA) frame structure, examples. Satellite switched TDMA onboard processing,

DAMA, code division multiple access (CDMA), spread spectrum transmission and reception.

UNIT-VI
EARTH STATION TECHNOLOGY:
Introduction, transmitters, receivers, Antennas, tracking systems, terrestrial interface, primary power test methods.

UNIT-VII
LOW EARTH ORBIT AND GEO-STATIONARY SATELLITE SYSTEMS:
Orbit consideration, coverage and frequency considerations, delay and throughput considerations, system considerations, operational NGSO constellation designs.

UNIT-VIII
SATELLITE NAVIGATION & THE GLOBAL POSITIONING SYSTEM:
Radio and satellite navigation, GPS position location principles, GPS receivers and codes, satellite signal acquisition, GPS navigation message, GPS signal levels, GPS receiver operation, GPS C/A code accuracy, differential GPS.

TEXT BOOKS:
1. Satellite communications-Timothi Pratt, Charles Bostian and Jeremy Allnutt, WSE, Wiley publications, 2nd Edition, 2003.
2. Satellite communications Engineering-Wilbur L.Prichard, Robert A. Nelson & Henry G.Suyderhoud, 2nd Edition, Pearson Publications, 2003.

REFERENCES:
1. Satellite communications: Design principles-M. Richharia, BS publications, 2nd Edition, 2003.
2. Satellite communications-D.C.Agarwal, Khanna publications, 5th Ed.
3. Fundamentals of Satellite communications-K.N.Raja rao, PHI, 2004.
4. Satellite communications-Dennis Roddy, McGraw Hill, 2nd Edition, 1996.

JAWAHARLAL NEHRU
TECHNOLOGICAL UNIVERSITY ANANTAPUR

Electronics and Communication Engineering
(9A04804) SPREAD SPECTRUM COMMUNICATIONS
(ELECTIVE – III)

B.Tech IV-II Sem. (E.C.E.)	**T**	**P**	**C**
	4	**0**	**4**

UNIT I
FUNDAMENTALS OF SPREAD SPECTRUM:
General concepts, Direct sequence (DS), Pseudo Noise (PN), Frequency Hopping, Time Hopping, Comparison of Modulation methods, Hybrid Spread spectrum systems, Chirp spread spectrum, Baseband modulation techniques.

UNIT II
ANALYSIS OF DIRECT SEQUENCE SPREAD SPECTRUM SYSTEMS:
Properties of PN sequences, Classes of periodic sequences, Properties of m sequences, Partial Co–relation, PN signal from PN sequences, Partial co – relation of PN signals, The PN Signal, De-spreading the PN signal, Interference rejection, Output signal to noise ratio, Antijam characteristics, Interception, Energy bandwidth efficiency.

UNIT III
ANALYSIS OF AVOIDANCE – TYPE SPREAD SPECTRUM SYSTEMS:
The frequency hopped signal, Interference rejection in a frequency hopping receiver, the time hopped signal.

UNIT IV
GENERATION OF SPREAD SPECTRUM SIGNALS:
Shift register sequence generators, Discrete frequency synthesizers, SAW device PN generators, Charge coupled devices, Digital tapped delay lines.

UNIT V
DETECTION OF SPREAD SPECTRUM SIGNALS - TRACKING:
Coherent direct sequence receivers, other method of carrier tracking, Delay lock loop analysis, Tau – Dither loop, Coherent carrier tracking, Non coherent frequency hop receiver.

UNIT VI
DETECTION OF SPREAD SPECTRUM SIGNALS - AQUISITION:
Acquisition of spread spectrum signals, Acquisition cell by cell searching, Reduction of acquisition time, Acquisition with matched filters, Matched filters for PN sequences, Matched filters for frequency hopped signals, Matched filters with acquisition - aiding waveform.

UNIT VII
APPLICATION OF SPREAD SPECTRUM TO COMMUNICATIONS:
General capabilities of spread spectrum, Multiple access considerations, Energy and bandwidth efficiency in multiple access, Selective calling and Identification, Antijam considerations, Error correction coding, Intercept consideration (AI), Miscellaneous considerations, Examples of spread spectrum systems.

UNIT VIII
CODE DIVISION MULTIPLE ACCESS DIGITAL CELLULAR SYSTEMS:
Introduction, Cellular radio concept, CDMA Digital cellular systems, Specific examples of CDMA digital cellular systems.

TEXT BOOKS:

1. George. R. Cooper and Clare D. McGillem, “Modren Communications and Spread Spectrum”, McGraw hill Book Company.
2. Roger L. Peterson, Rodger E. Ziemer & David E. Borth, “Introduction to Spread Spectrum Communications”, Prentice Hall 1995.

REFERENCES:

1. Dr. Kamilo Feher, “Wireless Digital Communications – Modulation & Spread Spectrum Applications”, PHI, 1999.
2. Upena Dalal, “Wireless Communication”, Oxford Higher Educatiion, 2009.
3. Andrea Goldsmith “Wireles Communications”, Cambridge University Press, 2005.

JAWAHARLAL NEHRU
TECHNOLOGICAL UNIVERSITY ANANTAPUR

Electronics and Communication Engineering
(9A05709) INFORMATION SECURITY
(Common to ECE, ECM)
(ELECTIVE – III)

B.Tech IV-II Sem. (E.C.E.)	**T**	**P**	**C**
	4	**0**	**4**

UNIT I
Is There A Security Problem in Computing: What Does Security Mean?, Attacks, The Meaning Of Computer Security, Computer Criminals, Methods of Defense, Terminology and Background, Substitution Ciphers, Transpositions(Permutations), Making good Encryption Algorithm, The Data Encryption Standard.

UNIT II
Program Security: Secure Programs, Non-Malicious Program Errors, Viruses and Other Malicious Code, Targeted Malicious Code.

UNIT III
Public-Key Cryptography and RSA, Key Management; Other public key Cryptosystems, Message Authentication and Hash Functions: Authentication Requirements, Authentication Functions, Message Authentication Codes, Hash Functions, Security Hash Functions and MACs, Hash and MAC Algorithms: Secure Hash Algorithm, Whirlpool.

UNIT IV
Digital Signatures and Authentication Protocols: Digital Signatures, Authentication Protocols.

UNIT V
Authentication Applications: Kerberos, Electronic Mail Security: Pretty Good Privacy, S/MIME.

UNIT VI

IP Security: IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combing Security Associations, Key Management.

UNIT VII

Web Security: Web Security Considerations, Secure Socket Layer and Transport Layer Security, Secure Electronic Transaction.

UNIT VIII

Intruders: Intruders, Intrusion Detection, Password Management, Firewalls: Firewall Design and Principles, Trusted Systems.

TEXT BOOKS:

1. Security in Computing, Charles P. Pfleeger, Shari Lawrence Pfleeger, Deven Shah, Pearson Education.
2. Cryptography and Network Security, William Stallings Fourth Edition, Pearson Education.

REFERENCES:

1. Cryptography and Information Security, V.K.Pachghare, PHI.
2. Information Security -Theory and Practice, Dhiren R. Patel, PHI.
3. Introduction to Cryptography, Buchmann, Springer.
4. Principles and Practices of Information Security, Michael E. Whitman and Herbert J. Mattord, Cengage Learning.
5. Information Systems Security, Godbole, Wiley Student Edition.

JAWAHARLAL NEHRU
TECHNOLOGICAL UNIVERSITY ANANTAPUR

Electronics and Communication Engineering
(9A04805) ADAPTIVE FILTER THEORY
(ELECTIVE – IV)

B.Tech IV-II Sem. (E.C.E.)	**T**	**P**	**C**
	4	**0**	**4**

UNIT – I
INTRODUCTION
The filtering problem, Adaptive filters, Linear Filter Structures, Approaches to the development of Linear Filtering algorithms, Real and Complex forms of Adaptive filters, Applications.

UNIT – II
STATIONARY PROCESSES AND MODELS
Partial characterization of a discrete–time stochastic process, Mean ergodic theorem, Correlation matrix and its properties, Stochastic models, Wold decomposition, Yule-Walker Equations, Complex Gaussian processes.

UNIT – III
EIGENANALYSIS
The Eigen value problem, Properties of Eigen values and eigenvectors, Low-rank modeling, Eigen filters, Eigen value computations.

UNIT – IV
WIENER FILTERS
Linear optimum filtering, Principle of orthogonality, Minimum mean squared error, Wiener-Hop equations, Error performance surface, Numerical example, Channel equalization, Linearly constrained minimum variance filter.

UNIT – V
LINEAR PREDICTION
Forward, and backward linear prediction, Properties of Prediction error filters, Autoregressive Modeling of stationary stochastic process, Cholesky factorization, Lattice Predictors.

UNIT – VI
KALMAN FILTERS
Recursive Minimum mean square estimation for scalar random variables, Statement of the Kalman filtering problem, Estimation of the state using the innovations process, Filtering, initial conditions, summary of the Kalman filter.

UNIT – VII
LINEAR ADAPTIVE FILTERING - I
Steepest Descent algorithm, example, characterization of the AR process, Least Mean Squared (LMS) algorithm, Examples, stability and performance analysis of the LMS algorithm, Summary of the LMS algorithm.

UNIT – VIII
LINEAR ADAPTIVE FILTERING – II
Method of Least Squares, Statement of the linear Least Squares-Estimation Problem, Data windowing, Principle of orthogonality, Singular value decomposition, Recursive Least Squares (RLS) algorithm, the matrix inverse lemma, exponentially weighted recursive least squares algorithm, time update of the tap weight vector, summary of RLS algorithm, examples.

TEXT BOOKS:
1. Simon Haykin, "Adaptive Filter Theory," Prentice Hall, New Jersey, 3rd Edition, 1996.
2. Bernard Widrow, and Samuel D. Stearns, "Adaptive Signal Processing," Prentice Hall, New Jersey, 1985.

REFERENCES:
1. John R. Treichler, C. R. Johnson, Jr., and M. G. Larimore, "Theory and Design of Adaptive Filters," PHI Learning Pvt. Ltd, New Delhi, 2009.
2. Alexander D. Poularikas, Zayed M. Ramadan, "Adaptive Filtering Primer with MATLAB," Taylor and Francis A CRC Press, N Y, 2006.
3. Antoniou, "Adaptive Filter Design," New York, NY: John Wiley and Sons, Inc., 1987.

JAWAHARLAL NEHRU
TECHNOLOGICAL UNIVERSITY ANANTAPUR

Electronics and Communication Engineering
(9A04806) WIRELESS COMMUNICATIONS & NETWORKS
(Common to ECE, ECM)
(ELECTIVE – IV)

B.Tech IV-II Sem. (E.C.E.)	**T**	**P**	**C**
	4	**0**	**4**

UNIT I

MULTIPLE ACCESS TECHNIQUES FOR WIRELESS COMMUNICATION: Introduction, FDMA, TDMA, Spread Spectrum, Multiple Access, SDMA, Packet radio, Packet radio protocols, CSMA protocols, Reservation protocols.

UNIT II

INTRODUCTION TO WIRELESS NETWORKING:
Introduction, Difference between wireless and fixed telephone networks, Development of wireless networks, Traffic routing in wireless networks.

UNIT III

WIRELESS DATA SERVICES:
CDPD, ARDIS, RMD, Common channel signaling, ISDN, BISDN and ATM, SS7, SS7 user part, signaling traffic in SS7.

UNIT IV

MOBILE IP AND WIRELESS ACCESS PROTOCOL:
Mobile IP Operation of mobile IP, Co-located address, Registration, Tunneling, WAP Architecture, overview, WML scripts, WAP service, WAP session protocol, wireless transaction, Wireless datagram protocol.

UNIT V

WIRELESS LAN TECHNOLOGY:
Infrared LANs, Spread spectrum LANs, Narrow bank microwave LANs, IEEE 802 protocol Architecture, IEEE802 architecture and services, 802.11 medium access control, 802.11 physical layer.

UNIT VI
BLUE TOOTH:
Overview, Radio specification, Base band specification, Links manager specification, Logical link control and adaptation protocol. Introduction to WLL Technology.

UNIT VII
MOBILE DATA NETWORKS:
Introduction, Data oriented CDPD Network, GPRS and higher data rates, Short messaging service in GSM, Mobile application protocol.

UNIT VIII
WIRELESS ATM & HIPER LAN:
Introduction, Wireless ATM, HIPERLAN, Adhoc Networking and WPAN.

TEXT BOOKS:

1. Wireless Communications, Principles, Practice – Theodore S. Rappaport, PHI, 2nd Ed., 2002.
2. Wireless Communication and Networking – William Stallings, PHI, 2003.

REFERENCES:

1. Wireless Digital Communications – Kamilo Feher, PHI, 1999.
2. Principles of Wireless Networks – Kaveh Pah Laven and P. Krishna Murthy, Pearson Education, 2002.
3. Wireless Communications – Andreaws F. Molisch, Wiley India, 2006.
4. Introduction to Wireless and Mobile Systems – Dharma Prakash Agarwal, Qing-An Zeng, Thomson 2nd Edition, 2006.

JAWAHARLAL NEHRU
TECHNOLOGICAL UNIVERSITY ANANTAPUR

Electronics and Communication Engineering
(9A04807) DATA COMMUNICATIONS
(Common to E Con E, ECE)
(ELECTIVE – IV)

B.Tech IV-II Sem. (E.C.E.)	**T**	**P**	**C**
	4	**0**	**4**

UNIT I

INTRODUCTION TO DATA COMMUNICATIONS AND NETWORKING:

Standards Organizations for Data Communications, Layered Network Architecture, Open Systems Interconnection, Data Communications Circuits, Serial and parallel Data Transmission, Data communications Circuit Arrangements.

SIGNALS, NOISE, MODULATION, AND DEMODULATION:

Signal Analysis, Electrical Noise and Signal-to-Noise Ratio, Analog Modulation Systems, Information Capacity, Bits, Bit Rate, Baud, and *M*-ary Encoding, Digital Modulation.

UNIT II

METALLIC CABLE TRANSMISSION MEDIA:

Metallic Transmission Lines, Transverse Electromagnetic Waves, Characteristics of Electromagnetic Waves, Transmission Line Classifications, Metallic Transmission Line Types, Metallic Transmission Line Equivalent Circuit, Wave Propagation on Metallic Transmission Lines, Metallic Transmission Line Losses.

OPTICAL FIBER TRANSMISSION MEDIA:

Advantages of Optical Fiber Cables, Disadvantages of Optical Fiber Cables, Electromagnetic spectrum, Optical Fiber Communications System Block Diagram, Optical Fiber construction, The Physics of Light, Velocity of Propagation, Propagation of Light Through an Optical fiber Cable, Optical Fiber Modes and Classifications, Optical Fiber Comparison, Losses in Optical Fiber Cables, Light sources, Light Detectors, Lasers.

UNIT III

DIGITAL TRANSMISSION:

Pulse Modulation, Pulse code Modulation, Dynamic Range, Signal Voltage –to-Quantization Noise Voltage Ration, Linear Versus Nonlinear PCM Codes, Companding, PCM Line Speed, Delta Modulation PCM and Differential PCM.

MULTIPLEXING AND T CARRIERS:

Time- Division Multiplexing, T1 Digital Carrier System, North American Digital Multiplexing Hierarchy, Digital Line Encoding, T Carrier systems, European Time- Division Multiplexing, Statistical Time – Division Multiplexing, Frame Synchronization, Frequency-Division Multiplexing, Wavelength- Division Multiplexing, Synchronous Optical Network.

UNIT IV

WIRLESS COMMUNICATIONS SYSTEMS:

Electromagnetic Polarization, Rays and Wavefronts, Electromagnetic Radiation, Spherical Wavefront and the Inverse Square Law, wave Attenuation and Absorption, Optical Properties of Radio Waves, Terrestrial Propagation of Electromagnetic Waves, Skip Distance, Free-Space Path Loss, Microwave Communications Systems, Satellite Communications Systems.

UNIT V

TELEPHONE INSTRUMENTS AND SIGNALS:

The Subscriber Loop, Standard Telephone Set, Basic Telephone Call Procedures, Call Progress Tones and Signals, Cordless Telephones, Caller ID, Electronic Telephones, Paging systems.

THE TELEPHONE CIRCUIT:

The Local Subscriber Loop, Telephone Message- Channel Noise and Noise Weighting, Units of Powers Measurement, Transmission Parameters and Private-Line Circuits, Voice-Frequency Circuit Arrangements, Crosstalk.

UNIT VI

CELLULAR TELEPHONE SYSTEMS:

Concepts – Frequency reuse- Cell splitting – Network components – Call Processing - First- Generation Analog Cellular Telephone, Personal Communications system, Second-Generation Cellular

Telephone Systems, N-AMPS, Digital Cellular Telephone, Global system for Mobile Communications.

UNIT VII

DATA COMMUNICATIONS CODES, ERROR CONTROL, AND DATA FORMATS:

Data Communications Character Codes, Bar Codes, Error Control, Error Detection, Error Correction, Character Synchronization.

DATA COMMUNICATIONS EQUIPMENT:

Digital Service Unit and Channel Service Unit, Voice- Band Data Communication Modems, Bell Systems- Compatible Voice- Band Modems, Voice- Band Modern Block Diagram, Voice- Band Modem Classifications, Asynchronous Voice-Band Modems, Synchronous Voice-Band Modems, Modem Synchronization, ITU-T Voice- Band Modem Specifications, 56K Modems, Modem Control: The AT Command Set, Cable Modems, Probability of Error and Bit Error Rate.

UNIT VIII

DATA –LINK PROTOCOLS:

Data –Link Protocol Func tions, Character –and Bit- Oriented Protocols, Data Transmission Modes, Asynchronous Data – Link Protocols, Synchronous Data – Link Protocols, Synchronous Data – Link Control, High – Level Data – Link Control.

TEXT BOOKS:

1. Introduction to Data Communications and Networking, Wayne Tomasi, Pearson Education.

REFERENCES

1. Data Communications and Networking, Behrouz A Forouzan, 4th Edition, TMH.
2. Computer Communications and Networking Technologies, Gallow, 2nd edition, Thomson.
3. Computer Networking and Internet, Fred Halsll, Lingana Gouda Kulkarni, 5th Edition, Pearson Education.