

Course Offered by the TVE Department

- **Diploma in Technical Education (DTE)**
- **Bachelor of Science in Technical Education (B ScTE)**
- **Post Graduate Diploma in Technical Education (PGDTE)**
- **Master of Science in Technical Education (MScTE)**

Third Semester

L = Lecture. P = Practical / Workshop, T= Tutorial

Course Number	Course Title	Contract Hours	Credit Hours
		L – P – T	
TVE 4200	Industrial Attachment	0-0-2	1.00
TVE 4111	Occupational Analysis & Course Construction	3-0-0	3.00
TVE 4117	Curriculum Development Administration and Supervision of Technical and Vocational Education	3-0-0	3.00
TVE 4141	History of Technical and Vocational Education	3-0-0	3.00
TVE 4143	Comparative Education	3-0-0	3.00
TVE 4172	Technical Report Writing & Presentation	0-0-2	1.00
Technical Courses	Two technical courses from the respective specialization	6-0-9*	10.50*
	Total	L-T-P	18-0-13*
	Total	Hours	31* 24.50

*There may be slight deviation for different specialization.

Fourth Semester

L = Lecture. P = Practical / Workshop, T= Tutorial

Course Number	Course Title	Contract Hours	Credit Hours
		L – P – T	
TVE 4229	Instructional Technology and Communication Skills	3-0-0	3.00
TVE 4230	Instructional Technology and Communication Skills Lab	0-0-2	1.00
TVE 4205	Institution and Industry Relationship	2-0-0	1.00
TVE 4251	Sociology of Education	3-0-0	3.00
TVE 4235	Educational Measurement and Statistics	3-0-0	3.00
TVE 4236	Educational Measurement & Statistics Lab	0-0-2	1.00
TVE 4258	Observation and Practice Teaching	0-1-4	2.50
Technical Courses	Two technical courses from the respective specialization	6-0-9*	10.50*
	Total	L-T-P	17-1-17*
	Total	Hours	35* 24.50

*There may be slight deviation for different specialization.

Bachelor of Science in Technical Education (B.Sc.T.E.)

1-Year Programme (HDE Stream)

First Semester

L = Lecture. P = Practical / Workshop,

T= Tutorial

Course Number	Course Title	Contract Hours	Credit Hours
		L – P – T	
TVE 4127	Methods and Techniques of Teaching	3-0-0	3.00
TVE 4128	Methods and Techniques of Teaching Lab	0-0-2	1.00
TVE 4111	Occupational Analysis & Course Construction	3-0-0	3.00
TVE 4139	Principles of Technical and Vocational Education	3-0-0	3.00
TVE 4143	Comparative Education	3-0-0	3.00
Technical Courses	Two technical courses from the respective specialization	6-0-9*	10.50*
Total		L-T-P	18-0-11*
Total		Hours	29* 23.50*

*There may be slight deviation for different specialization.

Second Semester

L = Lecture. P = Practical / Workshop,

T= Tutorial

Course Number	Course Title	Contract Hours	Credit Hours
		L – P – T	
TVE 4229	Instructional Technology and Communication Skills	3-0-0	3.00
TVE 4230	Instructional Technology & Communication Skills Lab	0-0-2	1.00
TVE 4205	Institution and Industry Relationship	2-0-0	2.00
TVE 4251	Sociology of Education	3-0-0	3.00
TVE 4235	Educational Measurement and Statistics	3-0-0	3.00
TVE 4236	Educational Measurement and Statistics Lab	0-0-2	1.00
TVE 4258	Observation and Practice Teaching	0-1-4	2.50
Technical Courses	Two technical courses from the respective specialization	6-0-9*	9.00*
Total		L-T-P	17-1-17*
Total		Hours	35* 24.50*

*There may be slight deviation for different specialization.

Course Contents

- **Diploma in Technical Education (DTE)**
- **Bachelor of Science in Technical Education (B.Sc.TE)**
- **Post Graduate Diploma in Technical Education (PGDTE)**
- **Master of Science in Technical Education (MSc.TE)**

B.Sc.T.E. (2-Yr)

1st Semester

Hum 4132 Arabic 1 / English 1 2-0-0 Credit 1.00

Reading comprehension; Letters and pronunciation; Construction of words; Letters (Shamsi & Kamari) in words; Determiners and pronouns; Interrogatives; Nominal and verbal sentences, Adverbs; Tenses; Feminine and masculine genders; Numerals; Conjunctive adverbs; Conversation and dialogues in real life. Improvement of communication skill using audio-visual aid.

Text Books:

1. Abdur Rahman Ibraheem Al-Fawazn (2004). الطالب كتاب يدك بين العربية Al-Arabiah Baina Yadaik Kitabut Talib (1), Arabic for All, Kingdom of Saudi Arabia.
2. Abdur R., V. (2004). Madina Arabic Reader, Goodword Books, India.
3. Abu Tahir Al-Misbah (2013). Al-Tariq Ila Al-Arabiah, Darul Kalam, Madrasatul Madina, Dhaka.

Hum 4134 Arabic 1 / English 1 2-0-0 Credit 1.00

Listening & Speaking: Situational dialogues; Use of dialogues in conversations; Reading out, talks; Listening to prescribed cassettes; Watching documentaries. Reading: Reading comprehension; Reading for pleasure; Reading for understanding; Reading with strategies. Writing & Grammar: Word classes, sentence types; Number, person, gender; Tenses and sequences of tenses; Nouns and determiners; Operators; If-clauses; Paragraphs & letters; Text analysis. Vocabulary: In lists; Contextualized; In talks; In exercises.

Text Books:

1. Liz and John Soars (2003). New Headway (Intermediate, 3rd edition, Oxford University Press.
2. John Eastwood (2002). Oxford Practice Grammar, 2nd edition, Oxford University Press.

Hum 4137 Islamiyat 3-0-0 Credit 3.00

Contents: Islam as Din; Sources of Islamic Code of Life; Social, Economic and Political system of Islam; Islamic; Ethics: Human values in Islam, Dignity of Man, Women & Islam Family Ties, Moral values, Decency and Decorum, Brotherhood, Friendship and Amity in Human society, Truthfulness, Honesty, Sincerity, Righteousness, Piety and Religiousness; Social vices; Role of Islam in eradicating social evils; Islam and Environment; Islam and the world peace.

Text Books:

1. Bin Taimiyah, Sheikh UL Islam (2000). The Fundamental Beliefs of Islam and rejection of false Concepts. Riyadh, Dar-US-Salam Publication.
2. Musa Mahammad Youssef (1993). Islam and Humanities Need of it. Ministry Waqf, SCIA, Cairo.

Hum 4151 Social Studies & Accounting**3-0-0****Credit 3.00**

Social Studies: Concepts of family and society (Islamic and non-Islamic); Growth of family and society; functions of family and society, obligation of family and social life. State and Nation: Elements of state and their characteristics; functions of the State, definition of the Nation, elements of the Nation and their characteristics; Relationship between Nation and State:-Islamic concept and Western concept. Government: - different forms and types of Government. Citizenship: - Rights and obligations. International Blocks and organizations:-OIC, UNO, Commonwealth of Nation etc. Resources of Moslem world. Possible Socio-economics and cultural integration of Moslem Countries.

Accounting: Define Accounting and Book-keeping; Distinguish between Accounting and Book-keeping; Users of Accounting information; Transactions processing, Journalizing, Accounts, Classification of accounts; Books of account for medium and small enterprises; Subdivision of Journal; Posting entries into ledger from Journal; Preparation of ledger accounts; Preparation of Sales and Purchase day Books, Sales Return and Purchase Return Books, Cash-Books and Journal; Capital Expenditure and Revenue Expenditure; Capital Receipts and Revenue Receipts; Preparation of Final Accounts including (Manufacturing Accounts) and Trading Account; Profit and Loss Account; Balance Sheets and Analysis of Balance Sheet & Income Statement; Accounting Information in Project Formulation; Reported and Appraisal; Cost Accounting and Elements of Cost; Preparation of Cost Sheet in production; Budget and Budgetary Control; Cost-volume; Profit Analysis (Break-even-analysis and Break-even point); Fund Flow and Cash flow Analysis.

Text Books:

1. Richard J. Gelles .Ann Levine (1995). Sociology .Clarinda Company,Von Hoffman, USA. Fifth edition.
2. Weygandt, Doland K., Paul, K. (2010).Accounting Principles.
3. Sankar P. B., Monilal D.(2011). Practice in Accountancy.
4. Rao, C.N.S. (2000) Sociology- Primary Principles, 3rd edition.

2nd Semester**Hum 4232 Arabic II / English II****2-0-0****Credit 1.00**

Contents: Reading comprehension, general exercise and revision of lessons; Nouns; singular, plural and various modifications; Use of verbs and pronouns, new words, different parts of speech.

Text Book:

1. John Eastwood (2002). Oxford Practice Grammar. Oxford University Press. 2nd edition.

Hum 4234 Arabic II / English II**2-0-0****Credit 1.00**

Contents: Listening & Speaking: Listening to dialogues, watching movies/documentaries; Conversations, Picture description, storytelling, etc.; Conversational traits. Reading: Reading for comprehension; Intensive reading; Time reading; Strategy-based reading; Reading comprehension exercises. Writing & Grammar: Conditionals, sentence change; Passivation, Reported speech; Modality, Prepositions; Adverbs,

adjectives; Embedded and super-ordinate clauses, operators; Letters and paragraphs; Writing letters, e-Mails, reports, stories on familiar and unfamiliar subjects. Miscellaneous: Vocabulary development; Contextualized vocabulary items; Word-games; Culture in language; Tenses and usage.

Text Book:

1. John Eastwood (2002). Oxford Practice Grammar. Oxford University Press. 2nd edition.

Hum 4237 Islamic History, Science & Culture 3-0-0 Credit 3.00

Contents: Life and works of the Prophet Muhammad (SM). Caliphate of the pious caliphs. Islamic Culture & Islamic festivals; Islamic Arts and Crafts; Importance of acquiring knowledge of Science and Technology in the light of the Holy Quran and the Sunnah; Relation between Science & Technology and Islam; Scientific indications in the Holy Quran, Impact of Science, Technology and Religion on Society and Social Development. Contributions of Islamic Civilization and Scientific achievement on the development of modern Science and Technology.

Text Book:

1. Farid,Ahmad (1995). An Encounter With Islam. Islamic Foundation,Dhaka, Bangladesh.

Hum 4249 Technology, Environment and Society 3-0-0 Credit 3.00

Contents: Definition of terminology – technology, environment, society and development; Inter-dependence of technology, environment, society and development; Growth of technologies and TVE contribution to human development; Current state of technology and TVE future use as an instrument of change in twenty first century; Impact of technology upon the environment, impact of the environment upon human changes in the global climates; Environment friendly technology, Technology and development; Renewable energy and environments. Technology and environment hazards, TVE remedy. Major hazards of industry. The improvement of working conditions in the industry.

Text Books:

1. William Cunningham and Marry Cunningham (2012) Principles of Environmental Science: Inquiry and Applications, 7th edition, McGraw-Hill Company Limited.
2. Andrew Blowers (2013). Planning for a Sustainable Environment. Routledge.
3. Rana, S.V.S. (2013). Essentials of Ecology and Environmental Science, PHI-Publication.
4. Zinatunnessa R.M.M. Khuda (2001). Environmental Degradation – Challenges of 21st Century, 1st edition, Environmental Survey and Research Unit.

TVE 4200 Industrial Attachment 2-0-0 Credit 1.00

The students (B.Sc.T.E.-2 Yr.) will be attached relevant industrial training program on the field of their specialization (MCE/EEE/CSE). This training program will be organized by IUT during the session brake in between 2nd and 3rd semester and is compulsory for all the students of the B.Sc.T.E. (2 Year) program. Duration of the training program will be about four weeks.

3rd Semester

TVE 4111 Occupational Analysis & Course Construction 3-0-0 Credit 3.00

Definition of terms such as job, occupation, vocation and profession; Classification of occupations; Occupational analysis – task analysis, learning tasks, identification, selection, sequencing and detailing of tasks; Performance objectives; Instructional package; Course construction – preliminary considerations for course construction; Types of educational structures; Preparing a course outline – difference between course of instruction and course outline, principal parts of a course outline – course outline format.

Text Book:

1. Siachino, Joseph W. (2001). course construction in industrial arts, vocational and technical education.
2. David H. Jonassen, Martin Tessmer, Wallace H. Hannum. Task Analysis Methods for Instructional Design. Publisher: Laurence Erlbaum Associates.
3. Siachino, JW and RO Sallington. Course Construction in industrial Arts, Vocational and Technical Education.

TVE 4117 Curriculum Development, Administration & Supervision of Technical and Vocational Education. 3-0-0 Credit 3.00

The origin and meaning of curriculum and TVE importance in education; concept; nature and scope of curriculum, relationship between curriculum and school; aims and functions of technical and vocational education, assessment of individual and social needs in respect of vocation, identification and formulation of educational objectives at different levels, selection and organization of contents and learning experiences; evaluation and assessment: purpose and techniques. Meanings and development of educational administration and supervision, structure and organization of technical and vocational education of OIC countries; meaning, concepts of leadership, leadership style; human relations in technical and vocational institutes, supervision & techniques of supervision; administrative competencies, innovations: types of innovation management, and evaluation of TVE.

Text Book3:

1. Finch, Curtis, R. (1996). Curriculum development in vocational & technical education.
2. Taylor (1997). Elements of Modern Curriculum.

TVE 4141 History of technical & vocational education 3-0-0 Credit 3.00

The origin of vocational education in Russia; historical background of technical and vocational education in French and Germany; advancement of technical education in England; development of vocational education in United States; development of vocational education in OIC countries.

Text Books:

4th Semester

TVE 4229 Instructional Technology and Communication Skill 3-0-0 Credit 3.00

Teaching, Learning and Instruction, Instructional Technology, Instructional Materials, Supplementary Materials, Significance of Instructional Materials, Classification of Instructional Materials, Criteria for selection of Instructional Materials, Improvised Instructional Materials. Teaching Aids, Computer Assisted Instruction (CAI); E-learning and Web-based instruction, Types of instructional materials; hardware and software; audio-visual materials and equipment; Instruction through ICTs, Instructional resources center and maintenance of instructional materials.

Basic principles of communication in teaching learning process; concept and theoretical basis of communication; linguistic and nonlinguistic communication, process of communicative association and message reliability; organization of communication; agents of communications; Concept and Nature of classroom communications, Role of communication in teaching and learning, Criteria of effective communication, Online communication, , Communication through Social networking.

Text Books:

1. Davies, I.V. (1999) Instructional Technique.
2. Ellirgton, H. & Race. P. (2010). Producing Teaching Materials, Kogan Press.
3. Kemp, J.E (2013). Planning & Producing Audiovisual Materials, Harper & Row.

TVE 4230 Instructional Technology and Communication Skill Lab 0-0-3 Credit 1.50

Practice and Lab work based on TVE 4229.

(0-0-1 hour for Instructional Technology practice and developing instructional material for teaching-learning, and 0-0-2 hours for CAI Lab) Application of Word-processing and spreadsheet in teaching-learning process; study of a suitable software package like Flash and Microsoft PowerPoint to create computer controlled presentations which can be shown directly on IBM compatible PC; designing, developing and testing simple CAL materials using the aforesaid software packages.

TVE 4205 Institution and Industry Relationship 2-0-0 Credit 2.00

Institution-industry collaboration; industry standard identification; basic organization design: institution & industry; communication and interpersonal skills development; staffing and HRM in the educational institution and industry; career building in the industry; problems of collaboration and coordination with industries; curriculum development and role of industry; apprenticeship training and education in the industry.

Text Books:

- 1 Stephen P. Robbins, Sahghamitra Bhattacharyya, David A. Decenzo, Madhugree Nanda Agarwal (2009). Fundamentals of Management: Essential concepts and applications. 6th edition, Pearson.
- 2 Andrew C. Payne, John V. Chelsom, Lawrence R.P., Reavill (1996). Management for Engineers. John Wiley & Sons, New-York.

TVE 4235 Educational Measurement and Statistics 3-0-0 Credit 3.00

Test, Measurement, Evaluation, Formative and Summative Assessment, Subjective and objective tests, Criteria of good test, Instructional objectives, General and behavioural objectives, Taxonomy of objectives. Test construction in different domains. Definition of statistics; Use of Statistics in Education, Frequency distribution, measures of central tendency, measures of variability / dispersion; Normal distribution curve and TVE use; Standard scores, percentiles, bivariate and multivariate, measures of relationship; Correlation coefficient, standard error of estimate; Regression analysis.

Text Books:

1. Garrett (1999). Statistics in psychology and education
2. Gibbs, G (2000). 53 Interesting Ways to Assess your students, Technical & Educational Services.
3. Loyd-Jones, L. (2011). Assessment From Principle to action. Mac Millan Educational Ltd.

TVE 4236 Educational Measurement and Statistics Lab 0-0-1 Credit 1.00

The Lab practice will be conducted based on the theories of TVE 4235 Educational Measurement and Statistics.

TVE 4258 Observation & Practice Teaching 0-1-4 Credit 2.50

Development of further skills in teaching: Core teaching skills and their components; skills in questioning; skills of reinforcements; illustration and narration; Measures for integrating skills. Microteaching: Definition and meaning of Microteaching; phases of microteaching, important features of microteaching; models of microteaching, critical evaluation of microteaching. Practice of skills through microteaching Simulation of Teaching, observation of classroom teaching, Development of observation schedule.98). Measurement statistics and guidance education.

TVE 4203 Psychology of Teaching-Learning 3-0-0 Credit 3.00

Concepts of Educational Psychology, Role of Educational Psychology in teaching and learning. Aim of Educational Psychology. Determine learning style, Theories of learning: Thorndike, Pavlov, Skinner, Bruner and Piaget; Determine problems related with learning; Learning modeling; Learning domains; Principles of Learning and Motivation; Psychological qualities of a teacher, Classroom leadership and management, The role of teacher: Instructional and Psychological, Characteristics of effective teacher, Instructional design and use of students' Psychology; Teacher-student interaction: through social networking, ICTs and Web-based e-learning.

Text Books:

1. Bhattachariya (2011). Psychology foundation of education.
2. Robert F. Biehler (2007). Psychology Applied to Teaching, Houghton Mifflin Company, Boston, first printed in 1952, ISBN 0-395-04191-0, ISBN 0-395-11921-9, Printed in USA.

1. Gage & Berliner (2013). Educational Psychology, Houghton, Mifflin.

TVE 4200 Industrial Attachment 0-0-2 Credit 1.00

The students (B.Sc.T.E.-2 Yr.) will be attached relevant industrial training program on the field of their specialization (MCE/EEE/CSE). This training program will be organized by IUT during the session break in between 2nd and 3rd semester and is compulsory for all the students of the B.Sc.T.E. (2 Year) program. Duration of the training program will be about four week.

B.Sc. T.E. (1-Yr)

1st Semester

TVE 4127 Methods & Techniques of Teaching 3-0-0 Credit 3.00

Principles of: learning, teaching and motivation in higher education. Introduce recent trends in teaching and learning: teacher-centred and student-centred teaching; deep level and surface level learning. Teaching methods in common use. Teaching aids and their use. Lesson planning; Information and Communication Technology (ICT) in education: what is ICT and its benefits in education system (pedagogical, administrative, professional); its impact on teaching and learning, barriers of introducing ICT in the developing country. Classroom management: discipline in the workshop (lab) and classroom.

Text Books:

1. Wadhwa, S. (2000). Text: The psychology of teaching.
2. Bhat, B.D (2011). Modern method of teaching: concepts & technique.
3. Kourilsky, Marilyn (2012). Effective teaching.

TVE 4128 Methods & Techniques of Teaching 0-0-2 Credit 1.00
Lab

Practical work related to TVE 4127.

TVE 4111 Occupational Analysis & Course Construction 3-0-0 Credit 3.00

Definition of terms such as job, occupation, vocation and profession; Classification of occupations; Occupational analysis – task analysis, learning tasks, identification, selection, sequencing and detailing of tasks; Performance objectives; Instructional package; Course construction – preliminary considerations for course construction; Types of educational structures; Preparing a course outline – difference between course of instruction and course outline, principal parts of a course outline – course outline format.

Text Book:

4. Siachino, Joseph W. (2001). course construction in industrial arts, vocational and technical education.
5. David H. Jonassen, Martin Tessmer, Wallace H. Hannum. Task Analysis Methods for Instructional Design. Publisher: Laurence Erlbaum Associates.
6. Siachino, JW and RO Sallington. Course Construction in industrial Arts, Vocational and Technical Education.

TVE 4139 Principles of Technical & Vocational Education 3-0-0 Credit 3.00

Concept, nature and scope of vocational and technical education; socio-economic needs and psychological bases; historical development; problems of vocational technical educational organization, administration, instruction and evaluation of vocational and technical education.

Text Books:

1. Collins, H. (1998). European vocational education system
2. Rashtriya, T. (2000). Vocational education.

Rao, V.K. (2011) Vocational education.

TVE 4143 Comparative Education 3-0-0 Credit 3.00

Concept, nature and scope of comparative education; methodology of comparative education; forces responsible for different types of educational programmes; political, social and economic determinants of educational programmes; systems of education, particularly vocational and technical education, in selected developed countries - U.K., France, U.S.A., Russia, and in one of the OIC countries; special and innovative programmes particularly in OIC countries.

Text Books:

3. Sodhi, T.S (2008). A text book Comparative Education
4. Sodhi, T.S (2010). Comparative Education.

TVE 4172 Technical Report Writing & Presentation 0-0-2 Credit 1.00

Definition; nature, basic concepts and principles of technical report writing; importance of technical report writing. *Process of technical reporting*: Fundamentals of report writing, planning steps of preparing technical report. Technical writing style, format, techniques of writing, technical writing process, role of language in report writing, referencing. Preparation of draft report, editing the draft report, finalization of the report. *Presentation of the report before the audience*: Role of computer in report preparation, structure and layout of presentation the report, prepare a visual presentation of report. Oral presentation of a report through computer and multimedia projector, use of related computer software.

Text Books:

3. Jahangir, K. G. (2012) Business Communication and Report Writing. Ajizia Book Depot, 38 Banglabazar, Dhaka-1100.
4. Sharma, R. C., Krishna Mohan (2012). Business Correspondence and Report Writing: a practical approach to business and technical communication, ISBN 0-07-044555-9, Tata McGraw Hill Companies.

2nd Semester

TVE 4229 Instructional Technology and Communication Skill 3-0-0 Credit 3.00

Teaching, Learning and Instruction, Instructional Technology, Instructional Materials, Supplementary Materials, Significance of Instructional Materials, Classification of Instructional Materials, Criteria for selection of Instructional Materials, Improvised Instructional Materials. Teaching Aids, Computer Assisted Instruction (CAI); E-learning and Web-based instruction, Types of instructional materials; hardware and software; audio-visual materials and equipment; Instruction through ICTs, Instructional resources center and maintenance of instructional materials.

Basic principles of communication in teaching learning process; concept and theoretical basis of communication; linguistic and nonlinguistic communication, process of communicative association and message reliability; organization of communication; agents of communications; Concept and Nature of classroom communications, Role of communication in teaching and learning, Criteria of effective communication, Online communication, , Communication through Social networking.

Text Books:

4. Davies, I.V. (1999) Instructional Technique.
5. Ellirgton, H. & Race. P. (2010). Producing Teaching Materials, Kogan Press.
6. Kemp, J.E (2013). Planning & Producing Audiovisual Materials, Harper & Row.

TVE 4230 Instructional Technology and Communication Skill Lab 0-0-3 Credit 1.50

Practice and Lab work based on TVE 4229.

(0-0-1 hour for Instructional Technology practice and developing instructional material for teaching-learning, and 0-0-2 hours for CAI Lab) Application of Word-processing and spreadsheet in teaching-learning process; study of a suitable software package like Flash and Microsoft PowerPoint to create computer controlled presentations which can be shown directly on IBM compatible PC; designing, developing and testing simple CAL materials using the aforesaid software packages.

TVE 4205 Institution and Industry Relationship 2-0-0 Credit 2.00

Institution-industry collaboration; industry standard identification; basic organization design: institution & industry; communication and interpersonal skills development; staffing and HRM in the educational institution and industry; career building in the industry; problems of collaboration and coordination with industries; curriculum development and role of industry; apprenticeship training and education in the industry.

Text Books:

- 3 Stephen P. Robbins, Sahghamitra Bhattacharyya, David A. Decenzo, Madhughee Nanda Agarwal (2009). Fundamentals of Management: Essential concepts and applications. 6th edition, Pearson.
- 4 Andrew C. Payne, John V. Chelsom, Lawrence R.P., Reavill (1996). Management for Engineers. John Wiley & Sons, New-York.

TVE 4235 Educational Measurement and Statistics 3-0-0 Credit 3.00

Test, Measurement, Evaluation, Formative and Summative Assessment, Subjective and objective tests, Criteria of good test, Instructional objectives, General and behavioural objectives, Taxonomy of objectives. Test construction in different domains. Definition of statistics; Use of Statistics in Education, Frequency distribution, measures of central tendency, measures of variability / dispersion; Normal distribution curve and TVE use; Standard scores, percentiles, bivariate and multivariate, measures of relationship; Correlation coefficient, standard error of estimate; Regression analysis.

Text Books:

4. Garrett (1999). Statistics in psychology and education
5. Gibbs, G (2000). 53 Interesting Ways to Assess your students, Technical & Educational Services.
6. Loyd-Jones, L. (2011). Assessment From Principle to action. Mac Millan Educational Ltd.

TVE 4236 Educational Measurement and Statistics Lab 0-0-1 Credit 1.00

The Lab practice will be conducted based on the theories of TVE 4235 Educational Measurement and Statistics.

TVE 4258 Observation & Practice-Teaching 0-1-4 Credit 2.50

Development of further skills in teaching: Core teaching skills and their components; skills in questioning; skills of reinforcements; illustration and narration; Measures for integrating skills. Microteaching: Definition and meaning of Microteaching; phases of microteaching, important features of microteaching; models of microteaching, critical evaluation of microteaching. Practice of skills through microteaching Simulation of Teaching, observation of classroom teaching, Development of observation schedule.98). Measurement statistics and guidance education.

TVE 4203 Psychology of Teaching-Learning 3-0-0 Credit 3.00

Concepts of Educational Psychology, Role of Educational Psychology in teaching and learning. Aim of Educational Psychology. Determine learning style, Theories of learning: Thorndike, Pavlov, Skinner, Bruner and Piaget; Determine problems related with learning; Learning modeling; Learning domains; Principles of Learning and Motivation; Psychological qualities of a teacher, Classroom leadership and management, The role of teacher: Instructional and Psychological, Characteristics of effective teacher, Instructional design and use of students' Psychology; Teacher-student interaction: through social networking, ICTs and Web-based e-learning.

Text Books:

3. Bhattachariya (2011). Psychology foundation of education.

4. Robert F. Biehler (2007). *Psychology Applied to Teaching*, Houghton Mifflin Company, Boston, first printed in 1952, ISBN 0-395-04191-0, ISBN 0-395-11921-9, Printed in USA.
2. Gage & Berliner (2013). *Educational Psychology*, Houghton, Mifflin.

MCE Courses for BScTE 2 Year & 1 Year Program

Specialization: Mechanical Engineering

2-Year 1st semester

Course Number	Course Title	Contract Hours	Credit Hours
		L – P – L	L – P – L
		Theory	Lab
Math 4599	Vector Analysis	3-0-0	3.00
MCE 4591	Fluid Machinery	3-0-0	3.00
MCE 4592	Fluid Machinery Lab	0-0-1.5	0.75
MCE 4593	Control System and Automation	2-0-0	2.00
MCE 4594	Control System and Automation Lab	0-0-1.5	0.75
MCE 4595	Mechanics of Machines	3-0-0	3.00
MCE 4596	Mechanics of Machines Lab	0-0-1.5	0.75

2-Year 2nd semester

Course Number	Course Title	Contract Hours	Credit Hours
		L – P – L	L – P – L
		Theory	Lab
Math 4699	Linear Algebra	3-0-0	3.00
MCE 4691	Machine Tools	3-0-0	3.00
MCE 4692	Machine Tools Lab	0-0-1.5	0.75
MCE 4693	Machine Design I	2-0-0	2.00
MCE 4694	Machine Design Practice - I	0-0-2	1.00
MCE 4695	Mechanics of Materials	4-0-0	4.00
MCE 4696	Mechanics of Materials Lab	0-0-1.5	0.75

2-Year 3rd Semester and 1-Year 1st Semester

Course Number	Course Title	Contract Hours	Credit Hours
		L – P – L	L – P – L
		Theory	Lab
MCE 4700	Project and Thesis-I	0-0-6	3.00
MCE 4791	Applied Thermodynamics	3-0-0	3.00
MCE 4792	Applied Thermodynamics Lab	0-0-1.5	0.75
MCE 4793	Production and Operations Management	3-0-0	3.00
MCE 4795	Vibration and System Dynamics	3-0-0	3.00
MCE 4797	Machine Design II	3-0-0	3.00
MCE 4798	Machine Design Practice - II	0-0-2	1.00
MCE 4799	Manuf. System & Automation	3-0-0	3.00

*Any two technical courses from the respective specialization.

2-Year 4th Semester and 1-Year 2nd Semester

Course Number	Course Title	Contract Hours	Credit Hours
		L – P – L	L – P – L
		Theory	Lab
MCE 4800	Project and Thesis-II	0-0-6	3.00
MCE 4891	Advanced Fluid Mechanics	3-0-0	3.00
MCE 4893	Power Plant Engineering	3-0-0	3.00
MCE 4895	Mechatronics	3-0-0	3.00
MCE 4896	Mechatronics Lab	0-0-1.5	0.75
MCE 4897	Solar Energy Conversion	3-0-0	3.00
MCE 4899	Heat and Mass Transfer	3-0-0	3.00

*Any two technical courses from the respective specialization.

MCE Courses (BScTE) 2-Yr

1st Semester

Math 4599 Vector Analysis 3-0-0 Credit 3.00

Contents: Vector Algebra: Scalars, vectors and their representation to physical quantities. Linear dependence, dot and cross product of vectors with geometrical interpretation and their application. Triple and multiple product of vectors and their applications.

Vector Calculus: Vector differentiation and integration and their elementary applications to geometry and mechanics. Scalar and vector point function. Gradient of a scalar point function. Divergence and curl of a vector point function. Line, surface and volume integrals. Green's theorem, Gauss's theorem and Stokes' theorem with applications.

Complex Variables: Complex number system. Complex function. Limit and continuity of a complex function. Complex differentiation and the Cauchy-Riemann equations. Line integral of a complex function. Cauchy's integral formula. Laurent's theorem. Singularities, poles, residues. Cauchy's residue theorem. Contour integration. Conformal mapping.

Text Book:

1. Louis Brand, 'Vector Analysis (Dover Books on Mathematics)', Dover Publications, 2006

Reference Book:

1. Murray Spiegel, Seymour Lipschutz, Dennis Spellman, 'Vector Analysis', McGraw Hill, 2009
2. L R Shorter, 'Problems and Worked Solutions in Vector Analysis (Dover Books on Mathematics)', Dover Publications, 2014

MCE 4591 Fluid Machinery 3-0-0 Credit 3.00

Contents: Hydraulic turbines, Euler turbine equation, degree of reaction, impulse and reaction turbines, Pelton wheel, Francis turbine, Kaplan turbine, main components, and their performance. Specific speed. Hydraulic power plants, selection of turbines and sites.

Introduction to fluid movers. Classification of pumps. Reciprocating pumps, applications, operating principles, performance characteristics. Centrifugal pumps, applications, operating principles, performance characteristics, cavitation, priming, parallel and series operations, specific speed, selection. Turbine pump, construction, working principles, characteristics, applications. Applications and selection of gear pumps, vane pumps and piston pumps.

Reciprocating compressors, principles of operation, single-stage and multi-stage compressors, intercooling, applications. Centrifugal compressors and axial flow compressors, performance characteristics, efficiencies, applications, selection. Applications and selection of rotary, screw and lobe type compressors. Fans and blowers, operating principles, types, applications and performances.

Hydraulic intensifiers, jacks, cranes and lifts.

Text Book:

1. Frank M White, "Fluid Mechanics", TATA McGRAW HILL, 2010.

Reference Book:

1. Yunus A Cengel, John M Cimbala, "Fluid Mechanics", McGRAW HILL, 2010.
2. Dr. Md. Quamrul Islam, "Hydraulic Machines", BUET, 1998.

MCE 4592 Fluid Machinery Lab 0-0-1.5 Credit 0.75

Contents: Experiments and study based on MCE 4591

MCE 4593 Control System and Automation 3-0-0 Credit 3.00

Introduction: Control & Automation, Classification of control systems, Hydraulic Systems: Fluid Power Actuators; Hydrostatic Transmission. Control Components in Hydraulic System; Hydraulic Circuit Design and Analysis; ANSI Symbols of Hydraulic Components, Control of a Double Acting Hydraulic Cylinder, Regenerative Circuit, Double Pump Hydraulic System, Hydraulic Cylinder Sequencing Circuit, Automatic Cylinder Reciprocating Circuit, Cylinder Synchronizing Circuit, Fail Safe Circuit, Speed Control of a Hydraulic Motor, Hydraulic Motor Braking System, Accumulators and Accumulators Circuits. Pneumatic Systems: Application of Gas Laws, Air Preparation. Sizing Pneumatic Systems; Pneumatic Actuators. Pneumatic Circuit Design and Analysis; Basic Symbols, Single and Double Acting Circuits, Sequence Circuits, Interlock Circuits. Hydraulic and Pneumatic Logic Control:, Moving Part Logic Systems. Electro pneumatics - Electrical signals, Signal flow in control system, Comparison between pneumatic and electro-pneumatic control systems, components of electrical signal control, Sensors for displacement and pressure, proximity sensors capacitive, inductive, and optical, pressure sensor, Relays & contactors.

Differential Equations from Physical Systems, Laplace and Inverse Laplace transformation, Transfer Function, Block Diagram, and Reduction of Block diagrams.

Text Book:

1. Katsuhiko Ogata, "Modern Control Engineering", Prentice Hall of India, 1995.

Reference Book:

1. Anthony Esposito, "Fluid Power with applications", Prentice Hall, 1997.
2. James A. Sullivan, "Fluid Power Theory and application", Prentice Hall, 1989.

**MCE 4594 Control System and Automation 0-0-1.5 Credit 0.75
Lab**

Contents: Experiments and study based on MCE 4593

MCE 4595 Mechanics of Machines 3-0-0 Credit 3.00

Contents: : Kinematics: Kinematic Link, Types of Link, Kinematic Pairs, kinematic Chain, Joints, Mechanism, Velocity acceleration of any point of a link, four-bar chain and slider-crank mechanism, etc., calculation of torque and forces from velocity and acceleration diagrams.

Gear trains and Drives: Gear Profiles Analysis of Geared systems for torque, velocity and acceleration, speed ratio of epicyclic trains.

Inertia Forces: Inertia forces in reciprocating parts, Velocity and Acceleration of the reciprocating parts in Engine, Angular velocity and acceleration of the connecting rod, Forces on the reciprocating parts of an Engine.

Fly wheels: Function of a flywheel, inertia forces, turning moment diagrams, maximum fluctuation of energy, co-efficient of fluctuation of speed, moment of inertia of a flywheel.

Power Transmission: Belt, rope, chain. Brake, clutches, Dynamometers.

Cams: Cams, Followers, Cam dynamics

Governors: Function, analysis of different type of governors, power, effort and stability.

Balancing: Static and dynamic balancing of rotating masses in the same plane and in the different planes.

MCE 4596 Mechanics of Machines Lab 0-0-1.5 Credit 0.75

Contents: Experiments and study based on MCE 4595

2nd Semester

MCE 4699 Linear Algebra 3-0-0 Credit 3.00

Linear Algebra: Introduction to systems of linear equations. Gaussian elimination. Definition of matrices. Algebra of matrices. Transpose of a matrix and inverse of a matrix. Factorization. Determinants. Quadratic forms. Matrix polynomials. Euclidean n-space. Linear transformations from \mathbb{R}^n to \mathbb{R}^m . Properties of linear transformations from \mathbb{R}^n to \mathbb{R}^m . Real vector spaces and subspaces. Basis and Dimension. Rank and Nullity. Inner product spaces: Gram-Schmidt process and QR-Decomposition. Eigenvalues and eigenvectors. Diagonalization. Linear transformations: Kernel and Range. Application of linear algebra to electric networks.

Fourier Analysis: Real and complex form of Fourier series. Fourier integrals, Fourier transforms and their uses in solving boundary value problems.

Text Book:

1. David C Lay, Steven R Lay and Judi J McDonald, 'Linear Algebra and Its Applications', 5th Edition, Pearson Education.

Reference Book:

1. Seymour Lipschutz and Marc Lipson, 'Schaum's Outline of Linear Algebra', 5th Edition, McGraw Hill.
2. David Poole, 'Linear Algebra: A Modern Introduction', 3rd Edition, Brooks Cole.

MCE 4691 Machine Tools 2-0-0 Credit 2.00

Mechanical, electrical hydraulic and pneumatic drives in machine tools. Bearings, slide ways, structure and control of machine tools. Detailed case study of engine lathe, turret lathe, milling machine, grinding machine, and gear shaping machine and gear hobbing machines, etc. Installation and acceptance tests of machine tools. Locating principles and locators, clamps, dies, jigs/fixtures. Non-conventional Machine tools, NC, CNC and DNC machine tools.

Text Book:

- 1 P. H. Joshi, "Machine Tools Hand Book", McGraw-Hill, 2007

Reference Book:

- 1 N. Chernov, "Machine Tools", Moscow: Mir Publishers, 1975.
- 2 N. K. Mehta, "Machine Tool Design", Tata-McGraw-Hill, 1984
- 3 M. Anwarul Azim, "Elements of Machine Tools", Publication Cum Info Wing, BUET, 2008

MCE 4692 Machine Tools Lab 0-0-1.5 Credit 0.75

Contents: Experiments and study based on MCE 4691

MCE 4693 Machine Design I 3-0-0 Credit 3.00

Properties of related engineering materials, selection of materials, working stresses, factor of safety, combined stresses, fatigue stresses, stress concentration service factor.

Endurance strength, design of members subjected to variable loads, critical speeds of shafts.

Journal bearings, ball and roller bearings.

Spur gears, design of spur gears transmission.

MCE 4694 Machine Design Practice I 1-0-0 Credit 1.00

Experiments and study based on MCE 4693

MCE 4695 Mechanics of Materials 4-0-0 Credit 4.00

Introduction, Axially Loaded Member, Indeterminate Members.

Torsion: Relationship between torque, shear stress and angle of twist, power-torque relation, stresses and deflections in helical springs, Thin Shells.

Shear force and Bending Moment: shear force and bending moment diagrams and equations. Locating Maximum Bending Moment, Point of Inflection, torsion and leaf spring.

Stresses in beams: Flexure Formula, Shear Stress Distribution, finding deflections from bending moment diagrams and by double integration, continuous beams, Beams of Two Materials.

Columns and Struts: critical load conditions, influence of end conditions. Euler's theory, other empirical formulae.

Combined Stresses: combined loading, principal planes, principal stresses, maximum shear stress, Mohr's circle for determining principal stresses. Strain Energy. Combination of different loads.

Theories of failures: Fatigue strength, Endurance limits, design stress, stress concentration, service factor. Impact loads.

Thick walled cylinders: Compound cylinders, stresses in thick walled cylinders. Experimental Stress Analysis: Welded and Riveted Joint

Text Book:

1. E.J. Hearn, "Mechanics of Materials", Butterworth & Heinemann, 1997.

Reference Book:

1. A. Pytel & F.L. Singer, "Strength of Materials", Pearson, 4th.
2. R.S. Khurmi, "Strength of Materials", S. Chand, 2004.

MCE 4696 Mechanics of Materials Lab 0-0-1.5 Credit 0.75

Contents: Experiments and study based on MCE 4695.

3rd Semester

MCE 4700 Project and Thesis I 3-0-0 Credit 3.00

The students are required to undertake a major project in the field of mechanical engineering. The objective is to provide an opportunity to the students to develop initiative, creative ability, confidence and engineering judgment. The results of the work should be submitted in the form of a report which should include appropriate drawings, charts, tables, references etc. together with product(s), if any.

MCE 4791 Applied Thermodynamics 3-0-0 Credit 3.00

Review of thermodynamic definitions, heat and work.

First Law of Thermodynamics. Stored energy. Application to closed, steady-flow, and non-steady flow systems. Limitations of the First Law.

Second Law of Thermodynamics -Kelvin-Planck and Classius's statements. Entropy - a property of the system. Clausius's Inequality. Boltzmann's concept of entropy. Principles of entropy increase. Calculations of entropy changes of steam and ideal gases for various processes.

Third Law of Thermodynamics.

Availability. Equation for maximum available energy. Helmholtz Function and Gibb's Function. Exergy and Energy.

Gas power cycles. Comparison of Otto, Diesel and Dual cycles. Stirling and Ericsson cycles. Brayton cycle and its analysis for maximum work output, and optimum thermal efficiency.

Fuels and combustion. Heat of Formation. Combustion processes at constant volume and at constant pressure. Heats of Reaction. Adiabatic Flame Temperature - its calculations

Pure substances. Phase diagrams. P-v-T surfaces. Critical point and Triple point. Compression of liquids. Clausius -Clapeyron equation. Compressibility Factor for gases. Real gases.

Vapour power cycles. Rankine cycle with superheat, reheat and 6 regeneration. Cycle efficiencies. Combined power cycles. Binary vapour power cycles.

Text Book:

1. P.K. Nag, "Engineering Thermodynamics", McGraw-Hill Company, 2008.

Reference Book:

1. J.B. Jones, G.A. Hawkins, "Engineering Thermodynamics", John Wiley & Sons Inc., 1986 .

2. J.P. Holman, "Thermodynamics", McGraw-Hill Book Co., Latest Edition.

MCE 4792 Applied Thermodynamics Lab 0-0-1.5 Credit 0.75

Contents: Experiments and study based on MCE 4791

MCE 4793 Production and Operations Management 3-0-0 Credit 3.00

Integrated purchase-production-marketing system, production systems, product /service life cycle, forecasting models, bill of materials. Material and inventory management: ABC analysis, coding and standardization, inventory models. Aggregate planning, Master production schedule (MPS), Material requirements planning (MRP), Manufacturing resource planning (MRPII), Enterprise resource planning (ERP), Capacity planning and Operation scheduling. Machine loading and line balancing. Plant layout.

Work study: Method study, time study, predetermined motion time systems (PMTS) and work sampling.

New frontiers: Supply chain management, optimized production technology, group technology, Total quality control (TQC), Just-in-time (JIT). Maintenance management.

MCE 4795 Vibration and System Dynamics 3-0-0 Credit 3.00

Vibration: Spring-mass elastic system, expression for motion, natural frequency, Cycle, Resonance, free and forced vibration, Damped and Undamped vibration, Single degree and two degrees of freedom, Longitudinal and Transverse Vibrations, torsional vibration; natural frequency of One rotor, two rotor and three rotor and geared systems, steady-state vibration and analysis, Lagrange's equation, energy methods, Rayleigh's method, Vibration Absorber, Modes of Vibrating System, Active and Passive Vibration Control, Nonlinear Vibration..

System Dynamics: Gyroscopic Couple and its effects on body, Balancing of reciprocating masses, Multicylinder inline and V engines, radial engines, direct and reverse crank. Rotating Unbalance, Solution methods for dynamical models; response types and stability, Laplace transformation method, Partial

fraction expansion, etc., State variable models and simulation methods for dynamical systems; state variable models, state variable models with Matlab, Matlab ODE functions, Simulink and linear models.

Text Book:

1. S. Rao, “Mechanical Vibration”, Pearson.

Reference Book:

1. William W. Seto, “Mechanical Vibration”, McGrawHill, Schaum,s Series.
2. William J. Plam, “Sytem Dynamics”, McGraw Hill, 2nd.
3. R.S. Khurmi, “Theory of Machines”, S. Chand, 2008.

MCE 4797 Machine Design II 3-0-0 Credit 3.00

Design of Machine Elements: Threaded fasteners, bolted members, power screws, riveted joints, welding, helical springs, leaf springs. Design of shafts, keys and splines, coupling, clutches brakes, flat belts and v-belts, chains, wire ropes Design of helical gears, bevel gears, and worm gears.

MCE 4798 Machine Design Practice II 0-0-3 Credit 1.5

Experiments and study based on MCE 4709

MCE 4799 Manufacturing System and Automation 3-0-0 Credit 3.00

Type of production, type of automation, transfer machines, handling of components in Batch production and mass production,. Computer numerically controlled bending, cutting, grinding and plastic moulding. Manufacturing aid and systems, Flexible manufacturing system. Advanced Manufacturing technology. Computer aided management and quality control. Programming and control of CNC machine and Robot.

4th Semester

MCE 4800 Project and Thesis II 3-0-0 Credit 3.00

Continuation of the project.

MCE 4891 Advanced Fluid Mechanics 3-0-0 Credit 3.00

Flow of compressible ideal fluid, relations for gases, energy equation, Mach number, stagnation point, Convergent nozzle, convergent divergent nozzle. Compressible fluid flow through pipes - adiabatic flow with friction, adiabatic flow without friction, and isothermal flow with friction. Normal and oblique shock. Lubrication of bearings, thin film lubrication, properties of petroleum lubricating oils.

Flow of incompressible fluids around immersed bodies, boundary layer concept, Dimensional analysis. Laminar and turbulent flow through pipes, eddy viscosity, mixing length, Reynolds stress, universal velocity distribution, seventh-root law laminar sub-layer, hydraulically smooth and rough pipes.

Introduction to inviscid incompressible flow, velocity potential, stream function.

Text Book:

- 1 Frank M White, "Fluid Mechanics", TATA McGRAW HILL, 2010.

Reference Book:

- 1 Yunus A Cengel, John M Cimbala, "Fluid Mechanics", McGRAW HILL, 2010.
2. Robert W. Fox, Alan T. McDonald, Philip J. Pritchard, John W. Mitchell, "Fluid Mechanics", Wiley, 2015.

MCE 4893 Power Plant Engineering 3-0-0 Credit 3.00

Power plants, hydraulic and thermal power plants, types of thermal power plants. Demand and supply of electrical power.

Steam power plants: Fuels, coal, oil, natural gas, fuel-bed firing, suspension firing. Boilers, superheaters, reheaters, economisers, air-preheaters. Draft system. Steam prime movers and their controls, condensers, cooling towers, feed water heaters, reheat and regenerative power cycles, feed-water treatment.

Gas turbine power plants: Gas turbines, basic components, practical cycle, intercooler, reheater and heat exchangers, characteristics. Combined gas turbine and steam plant

Diesel engine power plants. Diesel engines, their auxiliaries, fuel system, performance characteristics.

Introduction to nuclear power plants. Power plant economics, load curves, load curve analysis, selection of units, plant performance and operating characteristics, factors effecting cost of electrical energy, energy rates.

Text Book:

1. P.K. Nag,"Power Plant Engineering", McGraw-Hill (India) Book Co., 2008.

Reference Book:

1. J. Weisman, R. Eckart,"Modern Power Plant Engineering by Prentice-Hall (India) Pvt. Ltd", Latest Edition.
2. Vopat, Strosky, "Power Stations", Latest Editon.(1986).

MCE 4895 Mechanics 3-0-0 Credit 3.00

Introduction; Review of Mechanical, hydraulic and numeric control. Review of Electric Circuits; Review of Semiconductor Electronics; Analogue Signal Processing; Digital Signal Processing; Data Acquisition; Sensors; Actuators; Modeling, System Response, and Feedback Systems for Mechatronics; Micro-controller: Architecture and organisation, Instruction set and Assembly Language of Micro-controller. Micro-controller Applications Examples PLCs, Basics of PLC Programming, PLC Wiring Diagrams, PLC Components; Mechatronic Systems – Control Architectures.

Text Book:

EEE courses for TVE Students

Bachelor of Science in Technical Education (B.Sc.T.E.) 2 Years Programme (DTE Stream)

Specialization: Electrical and Electronic Engineering

First Semester

L = Lecture. P = Practical / Workshop T = Tutorial

Course Number	Course Title	Contract Hours	Credit Hours
		L – T - P	
Math 4529	Engineering Mathematics I	3-0-0	3.00
EEE 4599	Power System I	3-0-0	3.00
EEE 4591	Industrial Electronics I	3-0-0	3.00
EEE 4592	Industrial Electronics I Lab	0-0-1.5	0.75
EEE 4595	Switchgear & Control Equipment I	3-0-0	3.00
EEE 4596	Switchgear & Control Equipment I Lab	0-0-1.5	0.75
EEE 4593	Instrumentation Engineering I	3-0-0	3.00
EEE 4594	Instrumentation Engineering I Lab	0-0-1.5	0.75
EEE 4597	Telecommunication Principles	3-0-0	3.00
EEE 4598	Telecommunication Principles Lab	0-0-1.5	0.75

Note: Any four technical courses will be taken from above list for each semester.

Second Semester

Course Number	Course Title	Contract Hours	Credit Hours
		L – P – L	
Math 4629	Engineering Mathematics II	3-0-0	3.00
EEE 4691	Industrial Electronics II	3-0-0	3.00
EEE 4692	Industrial Electronics II Lab	0-0-1.5	0.75
EEE 4695	Switchgear & Control Equipment II	3-0-0	3.00
EEE 4696	Switchgear & Control Equipment II Lab	0-0-1.5	0.75
EEE 4699	Power System II	3-0-0	3.00
EEE 4693	Instrumentation Engineering II	3-0-0	3.00
EEE 4694	Instrumentation Engineering II Lab	0-0-1.5	0.75
EEE 4697	Radio Frequency Engineering	3-0-0	3.00
EEE 4697	Radio Frequency Engineering Lab	0-0-1.5	0.75
EEE 4689	Peripherals and Microprocessor Based Design	3-0-0	3.00
EEE 4690	Peripherals and Microprocessor Based Design	0-0-1.5	0.75

Note: Any four technical courses will be taken from above list for each semester.

Third Semester (2 Yr) & first Semester (1 Yr)

L = Lecture. P = Practical / Workshop T = Tutorial

Course Number	Course Title	Contract Hours	Credit Hours
		L – P – L	
EEE 4700	Project & Thesis	0-0-6	3.00
EEE 4791	Control System Engineering	3-0-0	3.00
EEE 4792	Control System Engineering Lab	0-0-1.5	0.75
EEE 4797	Power System Protection I	3-0-0	3.00
EEE 4798	Power System Protection II Lab	0-0-1.5	0.75
EEE 4799	Power System Engineering I	3-0-0	3.00
EEE 4799	Advanced Electronics I	3-0-0	3.00
EEE 4794	Advanced Electronics II Lab	0-0-1.5	0.75
EEE 4795	Microwave Theory & Tech I	3-0-0	3.00
EEE 4796	Microwave Theory & Tech I Lab	0-0-1.5	0.75

Note: Any two technical courses will be taken from above list for each semester.

Forth Semester (2-Yr) & second Semester (1-Yr)

Course Number	Course Title	Contract Hours	Credit Hours
		L – P – L	
EEE 4800	Project & Thesis	0-0-6	3.00
EEE 4895	Power Station	3-0-0	3.00
EEE 4899	Power System Protection II	3-0-0	3.00
EEE 4893	Advanced Electronics II	3-0-0	3.00
EEE 4894	Advanced Electronics II Lab	0-0-1.5	0.75
EEE 4891	Medical Electronics	3-0-0	3.00
EEE 4892	Medical Electronics Lab	0-0-1.5	0.75
EEE 4897	Microwave Theory & Tech II	3-0-0	3.00
EEE 4897	Microwave Theory & Tech II Lab	0-0-1.5	0.75
EEE 4889	Energy Conversion and Special Machines	3-0-0	3.00

Note: Any two technical courses will be taken from above list for each semester

EEE Course Contents for B.Sc.T.E. (2-Yr)

1st Semester

Math 4529 Engineering Mathematics I 3-0-0 Credit 3.00

Vector analysis: Tripe products, their geometric interpretation and application. Differentiation and integration of vectors Line, surface, and volume integrals. Gradient, divergence, curl, and their physical significance. Green's theorem, Stoke's theorem. Divergence theorem and their applications.

Statistics and elementary quality control: Correlation. Regression, Elementary probability theory. Binomial, Poisson and Normal distribution. Tests of hypothesis. Application of elementary quality control to practical problems.

Laplace Transform: Definition, elementary transformation and properties. Solution of differential and integro-differential equations using Laplace transformation and simple applications to circuit problems.

EEE 4599 Power System 1 3-0-0 Credit 3.00

Representation of power systems, single line diagrams, impedance and reactance diagrams, per-unit system of calculations. Reactances of synchronous generators and its equivalent circuits, Symmetrical fault calculations, limitation of short circuit current using reactors.

Symmetrical components, positive, negative and zero sequence network of generators, transformers and lines, Unsymmetrical fault calculations.

Power and reactive power flow calculations of simple systems, load flow studies of large systems, control of voltage, power and reactive power.

Text Books:

1. Elements of power system analysis by William D. Stevenson
2. Modern power system analysis by D P Kothari and I J Nagrath
3. Electrical Power Systems by Ashfaq Husain

EEE 4591 Industrial Electronics I 3-0-0 Credit 3.00

Brief review of (i) Junction Diode, (ii) Schottky Diode, (iii) Zener Diode. Introduction to thyristors: (i) SCR and (ii) TRIAC. Introduction to trigger devices: (i) UJT, (ii) PUT, (iii) Schottky diode, (iv) Silicon Unilateral Switch (SUS), (v) Diac; (vi) Silicon Bilateral Switch (SBS); (vii) Asymmetrical AC Trigger Devices. SCR power control circuits for DC and AC. TRIAC power control circuits for AC. Stabilized power supplies. Controlled Rectification: with SCRs for resistive and inductive loads, Single phase half-wave and full-wave rectification. Switch-mode power supplies. Magnetic Amplifiers, Induction Heating, Dielectric Heating and Microwave Heating.

Texts Books:

1. Power Electronics: Circuits, Devices and Applications : Circuits, Devices and Applications by Muhammad H. Rashid.
2. Power Electronics: Converters, Applications and Design, Media Enhanced by Mohan, undulant, robins.

EEE 4592 Industrial Electronics I Lab 0-0-1.5 Credit 0.75

Experiments based on EEE 4591

Text Books:

1. Power Electronics: Circuits, Devices and Applications : Circuits, Devices and Applications by Muhammad H. Rashid.
2. Power Electronics: Converters, Applications and Design, Media Enhanced by Mohan, undeland, robbins

EEE 4595 Switchgear & Control Eq. I 3-0-0 Credit 3.00

Fundamentals of fault clearing, current interruption in A.C. circuit breakers, recovery voltage and Restripping voltage transients, switching of capacitor banks and unloaded lines, rated characteristics of circuit breakers arc extinction, arc interruption, arc extinction in different types of circuit breakers, arc-extinction devices, operating mechanism, control apparatus. Air break circuit breakers, bulk oil circuit breakers, minimum oil circuit breakers, Sulphur Hexafluoride (SF-6) circuit breakers, air blast circuit breakers, vacuum circuit breakers and their comparative study Control panels, basic control circuit devices. Alternator switchgear and control panels, automatic voltage control equipment. Apparatus for automatic voltage control equipment. Apparatus for automatic synchronization control. Transformer tap changing control equipment. Automatic reclosing control of circuit breakers and oil circuit reclosers (OCRS).

Text Books:

1. Switchgear Protection and Power Systems by Sunil S Rao
2. Handbook of Switchgears by Bharat Heavy Electricals Limited

EEE 4596 Switchgear & Control I Lab 0-0-1.5 Credit 0.75

Experiments based on EEE 4595

Text Books:

1. Switchgear Protection and Power Systems by Sunil S Rao
2. Handbook of Switchgears by Bharat Heavy Electricals Limited

EEE 4593 Instrumentation Engineering I 3-0-0 Credit 3.00

Contents: Introduction to Instrumentation: Review of Conversion of non- electrical signals into electrical signals. Linear wave shaping Technique. Switching circuits, pulse Transfers and its uses into instrumentation. Pulse Generations: Generation of monostable, bistable and astable pulses. Schmitt Trigger, Blocking Oscillators.

Timing Circuits: Ramps Circuits - Constant-current ramps, Boot strap ramps, Auto generation of CRT sweeps. Use of logic Gates in Timing Circuits.

Analog to Digital Converts (A/D), and Digital to Analog Convert (D/A) and their uses in Instrumentation.

Text Books:

1. Electronics Measurements and Instrumentation by J.B. Gupta

2. Digital Fundamentals by Floyd
3. Measurement, Instrumentation and Experiment Design in Physics and Engineering by Michael Sayer and Abhai Mansingh

EEE 4594 Instrumentation Engineer I Lab 0-0-1.5 Credit 0.75

Experiments based on EEE 4593.

Text Books:

1. Microelectronic Circuit by A. S. Sedra, K.C. Smith
2. Operational and linear circuits by Ramakant A. Gayakward
3. Power Electronics by Muhammad Harunur Rashid

EEE 4597 Telecommunication Principles 3-0-0 Credit 3.00

Introduction to communication systems: Fundamental elements, various signals and tones, different types of telephone instruments, different types of transmission media, bandwidth requirements, signal to noise ratio and rate of communication.

Information theory: Measure of information, error free communication over a noisy channel, channel capacity.

Noise: External noise, internal noise, noise calculations and noise figure.

Modulation and demodulation: Baseband and carrier transmission. Amplitude modulation: SSB, DSB, VSB. Angle modulation: bandwidth of angle modulated wave, demodulation of AM and angle modulated waves.

Sampling and PCM: Sampling theorem, signal reconstruction, aliasing, quantization, PCM, DPCM, Companding.

Principles of digital data transmission: Simple digital communication system, line coding, pulse shaping, scrambling.

Multiplexing: FDM, FDM hierarchy. TDM, digital hierarchy (T1 carrier system)

Traffic analysis: Network traffic load and parameters, GOS, blocking parameters.

Text Books:

1. Modern digital & analog communication systems by B.P. Lathi, Zhi Ding
2. Digital & analog communication systems by Leon W. Couch.

EEE 4598 Telecommunication Principles Lab 0-0-1.5 Credit 0.75

Experiments based on EEE 4597

Text Books:

1. Modern digital & analog communication systems by B.P. Lathi, Zhi Ding
2. Digital & analog communication systems by Leon W. Couch.

2nd Semester

Math 4629 Engineering Mathematics II 3-0-0 Credit 3.00

Contents: Complex Variable: Introduction to complex variable. Complex differentiation and integration. Calculus of residues. Contour integration and conformal mapping.

Fourier Series: Fourier series expansion, evaluation of Fourier co-efficients, full range and half range series. Odd and even functions, harmonic analysis.

Numerical Analysis: Solution of polynomial equation and equation involving transcendental functions. Newton's forward and backward interpolation formulas. Runge-Kutta method. Numerical integration, Simpson's rule and trapezoidal rule. Advanced programming and numerical techniques and their application to engineering problems.

EEE 4691 Industrial Electronics II 3-0-0 Credit 3.00

Different types of transducers and their principle of operations: (i) Position and Displacement Transducers (a) Potentiometer, (b) Linear Variable Differential Transformers (LVDT), (ii) Pressure Transducer; (iii) Temperature Transducer; (iv) Optical Transducer; (v) Flow Transducer; (vi) Strain gauge Transducer; (vii) Ultrasonic Transducer; (viii) Humidity Transducer; (ix) Hall-Effect Transducer; (x) Speed Transducer.

Voltage Multipliers. Electronic Timers: using (i) UJT, (ii) PUT, (iii) IC 555 (iv) IC XR 2240. DC Motor Controls: (i) DC Motor braking and plugging circuits, (ii) Speed Control of PM/Shunt Motors: Electronic speed control using armature voltage control method, solid state motor speed controllers SCR speed control circuits for PM/shunt motor: (a) simple SCR circuit, (b) SCR plus UJT circuit: Variation of a pulse-width modulation (PWM) speed control circuit. (iii) Speed control of series/Universal motor: circuits using (a) SCR (half-wave control), (b) TRIAC and DIAC (full-wave control). TRIAC control with hysteresis compensation. (iv) DC Motor Reversing Control: Balanced bridge reversing drive for PM or Shunt motors, Reversing Control Circuit for Series DC Motors. AC Motor Controls: (i) AC motor braking, (ii) Speed control of AC Motors: Introduction to variable frequency converter. A simple single phase inverter using (i) transistors. A simple single phase inverter using SCRs (McMurray Bedford commutation circuit). A simple Three-phase six-step Inverter circuit. A simplified single phase cycloconverter. Amplifiers in Industrial Electronics: DC Amplifiers, Balanced Push-pull DC amplifier, Chopper and Chopper Amplifier, Chopper stabilized DC Amplifier. Introduction to semiconductor Laser.

Text Books:

1. Power Electronics: Circuits, Devices and Applications : Circuits, Devices and Applications by Muhammad H. Rashid.
2. Power Electronics: Converters, Applications and Design, Media Enhanced by Mohan, undeland, robbins

EEE 4692 Industrial Electronics II Lab 0-0-1.5 Credit 0.75

Experiments based on EEE 4691

Text Books:

1. Power Electronics: Circuits, Devices and Applications : Circuits, Devices and Applications by Muhammad H. Rashid.
2. Power Electronics: Converters, Applications and Design, Media Enhanced by Mohan, undeland, robbins

EEE 4695 Switchgear & Control Eq. II 3-0-0 Credit 3.00

Circuit breaker testing, type tests, routine tests, short circuit testing of circuit breakers, short circuit testing plants, insulation requirement and high voltage testing of circuit breakers, H.R.C. fuses and their applications, indoor switchgear, metalclad switchgear, low voltage control gear, contractors, low voltage circuit breakers, moulded case circuit breakers, isolators and earthing switches. Schemes of electrical layout and bus bar designs in different types of stations and sub-stations. Control of power by reactance, automatic supervisory control equipment. Automatic Control Equipment for stand by supply.

Text Books:

1. Switchgear Protection and Power Systems by Sunil S Rao
2. Handbook of Switchgears by Bharat Heavy Electricals Limited

EEE 4696 Switchgear & Control Eq II Lab 0-0-1.5 Credit 0.75

Text Books:

1. Switchgear Protection and Power Systems by Sunil S Rao
2. Handbook of Switchgears by Bharat Heavy Electricals Limited

EEE 4699 Power System II 3-0-0 Credit 3.00

Power system stability involving two-machine systems, swing equation. Equal-area criterion of stability and its applications, solution of swing equation, factors affecting transient stability. Economic operation of power systems: Distribution of load between units within a plant, Transmission loss as a function of plant Generation, Distribution of load between plants. Types of bus systems and their layout, current limiting reactors. Over-voltage in power systems, Lightning surges, switching surges, surge diverters.

Text Books:

1. Elements of power system analysis by Willium D. Stevenson
2. Modern power system analysis by D P Kothari and I J Nagrath
3. Electrical Power Systems by Ashfaq Husain.

EEE 4693 Instrumentation Engineering II 3-0-0 Credit 3.00

General instrumentation of plants: Operational amplifiers and their uses in instrumentation techniques. Digital instrumentation, Pneumatic instrumentation, signal conditioning. Data transmission. Indicating, recording and display systems. Case studies of instrumentation of a Chemical processing plant.

Text Books:

1. Electronics Measurements and Instrumentation by J.B. Gupta.
2. Measurement, Instrumentation and Experiment Design in Physics and Engineering by Michael Sayer and Abhai Mansingh.
3. Operational Amplifiers and Linear Integrated Circuits – 4e by Robert F. Coughlin, Frederick F. Driscoll

EEE 4694 Instrumentation Engineering II Lab 0-0-1.5 Credit 0.75

Experiments based on EEE 4693

Text Books:

1. Electrical and Electronic Measurements and Instrumentation by A.K. Sawhney.
2. Electronics Measurements and Instrumentation by J.B. Gupta

EEE 4697 Radio Frequency Engineering 3-0-0 Credit 3.00

Introduction to radio communication, Radio frequency management. Radio wave propagation and modeling, Free space propagation model, Radio wave reflections: Ground reflection model. Diffractions: Knife-Edge Diffraction Geometry, Fresnel Zones. Scattering: Rayleigh Criterion, Radar Cross Section Model. Log-Normal Shadowing. Outdoor Propagation Models: Okumura Model, Hata Model. Indoor Propagation Models: Attenuation Factor Model, Partition Losses.

Radio channel modeling, time-invariant and time varying channels. Stochastic and deterministic channel models. Frequency and time domain characterization of the radio channel. Small Scale Fading: Multipath channel characteristics, Delay spread, Coherence Bandwidth. Doppler Spread, Coherence time, Flat and Frequency Selective Fading, Slow and Fast Fading.

Radio planning for cellular mobile communication systems: Concept of frequency reuse and Co-channel reuse ratio. Co-channel and adjacent channel interference, cluster size and cell size, Sectoring, Cell splitting.

Link budget calculations for mobile communication.

Radio Frequency parameters for TDMA and CDMA systems: RxLev, RxQual. Spreading and Scrambling, OVSF codes, Primary and Secondary Scrambling Codes. Control and traffic channels for GSM and UMTS. Radio interface protocols for call set up and handover.

Radio Antennas: dipole, folded dipole, yagi arrays, transmission loss, radiation pattern, gain, directivity of antennas, antenna matching.

Text Books:

1. Wireless Communications: Principles and Practice by Theodore S. Rappaport
2. Wireless Communications and Networking by Vijay K. Garg

EEE 4698 Radio Frequency Engineering Lab 0-0-1.5 Credit 0.75

Experiments based on EEE 4697

Text Books:

1. Wireless Communications: Principles and Practice by Theodore S. Rappaport
2. Wireless Communications and Networking by Vijay K. Garg.

EEE 4689 Peripherals and Microprocessor Based Design 3-0-0 Credit 3.00

EEE 4619 Peripherals and Microprocessor Based Design 3-0-0 Credit 3.00

Design of Simple-As-Possible Computers: Concepts of parallel bus, tri-state buffers, register-register transfer; design of SAP-1, SAP-1 instruction set, programming of SAP-1, instruction cycles, improvement of SAP-1 using microprogramming and variable machine cycle; SAP-2 architecture, memory-reference instructions and register instructions, JUMP and CALL, examples of SAP-2 programs; SAP-3, stack instructions, extended-register instructions, the data pointer, PUSH and POP.

Different types of I/O devices: characteristics of different I/O devices; Programmed, Interrupt-driven, unconditional, conditional, standard and memory-mapped I/Os, Direct Memory Access (DMA); examples of different types of I/O devices. Methods of parallel data transfer: Simple input and Output, strobed I/O, handshake I/O. Programmable Parallel Port devices: The 8255 (or other devices), block diagram, modes of operation and initialization; design problems involving parallel interfacing using different modes of the PPI for controlling stepper motors, key matrices, ADCs, etc. Interrupts: the purpose of interrupts, software and hardware interrupts in the 80x86 family of microprocessors, interrupt vectors and vector tables, interrupt instructions, the Interrupt Service Routine, description of some software and hardware interrupts, sequence of operation on account of interrupt reception, interrupt flag bits, the sending of interrupt type number by interrupting device, expanding the interrupt structure. Programmable interrupt controller (PIC): The 8259 (or other devices), general description and block diagram, system connections, cascading of multiple 8259s, initializing the PIC– initialization command words and operational

command words. Programmable interval timer: The 8254 (or other devices), block diagram and system connections, modes and control words, interval timer applications.

Keyboard/Display Controller: The 8279 (or other devices), block diagram, initialization.

Text Books:

1. Microprocessors and Interfacing: Programming and Hardware by Douglas V. Hall.
2. The 8051 Microcontroller and Embedded Systems: Using Assembly and C by Muhammad Ali Mazidi, Janice G. Mazidi, Rolin D. McKinlay.

EEE 4620 Peripherals and Microprocessor Based Design Lab 0-0-1.5 Credit 0.75

Experiments based on EEE 4619

Text Books:

1. Microprocessors and Interfacing: Programming and Hardware by Douglas V. Hall
2. The 8051 Microcontroller and Embedded Systems: Using Assembly and C by Muhammad Ali Mazidi, Janice G. Mazidi, Rolin D. McKinlay.

3rd Semester (2-Yr) & 1st Semester (1-Yr)

EEE 4700* Project and Thesis-I 3-0-0 Credit 3.00

The students are required to undertake a project in the related field of Electrical and Electronic Engineering. The results of the work should be submitted in the form of a report.

EEE 4791 Control System Engineering 3-0-0 Credit 3.00

Concepts of an Engineering System and its representation. Dynamical System, their characterizations: mathematical models of physical systems; transfer function, signal flow diagrams. Steady state and transient response using place transform method; pole- zero concepts; error analysis. Stability analysis- Routh, Nyquist and Bode diagrams: Stability margins; M and N circles; Nichols chart; experimental determination for transfer functions. Root- locus method-plot and analysis. Design and compensation techniques, perform specifications, introduction to system compensation design with examples of lead and lag compensation.

EEE 4792 Control System Engineering Lab 0-0-1.5 Credit 0.75

Experiments based on EEE 4791.

EEE 4797 Power System Protection I 3-0-0 Credit 3.00

Introduction to power system protection, Explanation of the protective terms, Current transformers, HRC fuses, Electromechanical Relays, Over current relays, IDMT relays, Reverse power relays, Under frequency relays, Differential relays, Impedance, reactance and other types of distance relays, Static relays, Testing and maintenance of relays.

for gain, input and output impedance, Common Mode Rejection Ratio, Patient safety, Microshock and electrical Isolation; Measurement of sensory and motor NCV through evoked action potentials, Electrical Nerve Stimulation, Design of a nerve stimulator. Transducers: Electrode as transducer, electrical activity at electrode-body interface, electrode equivalent circuit, electrode impedance.

Heart conduction block and artificial pacemaker, Heart fibrillation and Defibrillator; Temperature, flow and velocity sensors as needed in Thermometry, and blood flow measurement; Blood Pressure measurement and monitoring, Blood Cell counters; Pulse beat monitor, Electronic Stethoscope, Focused Impedance Measurement, application ideas.

Ultrasound scanning techniques: A, B and M scans and applications, Use of LASER in medicine; Radioactivity and Radiotherapy; Hearing test, Correction of hearing; Basic concepts on Infrared heating, radio-frequency heating, Ultrasound heating, Bio-telemetry, Telemedicine; Basics of Clinical X-ray equipment, Fluoroscopy, Digital X-ray, CT scanner; Basics of Gamma Camera, SPECT, MRI and PET

EEE 4892 Medical Electronics Lab **0-0-1.5** **Credit 0.75**

Laboratory Experiments based on EEE 4891

EEE 4897 Microwave Theory & Tech II **3-0-0** **Credit 3.00**

Microwave oscillators and amplifiers: Principles of generation of millimeter and sub-millimeter waves; detailed analysis of Klystrons, Magnetrons and TWT amplifiers and backward wave oscillators. Harmonic generators, Gun-effect devices. Microwave circuits; Microwave network analysis and synthesis. Matrix representation and scattering matrix. Analysis of waveguide discontinuation of obstacles, junctions and cavities and strip lines. Methods of microwave precision measurements.

EEE 4898 Microwave Theory & Tech II Lab **0-0-1.5** **Credit 0.75**

Laboratory Experiments based on EEE 4897

EEE 4881 Energy Conversion and Special Machines **3-0-0** **Credit 3.00**

Contents:

Comments: New Course

CSE courses for B.Sc.T.E. (2-Yr)

Bachelor of Science in Technical Education (B.Sc.T.E.) 2-Yr Programme (DTE Stream)

Specialization: Computer Science and Engineering (CSE)

1st Semester

L = Lecture. P = Practical / Workshop T = Tutorial

Course Number	Course Title	Contract Hours	Credit Hours
		L – T - P	
Math 4529	Engineering Mathematics I	3-0-0	3.00
CSE 4573	Microprocessor and Assembly Language Programming	3-0-0	3.00
CSE 4574	Microprocessor and Assembly Language Programming Lab	0-0-1.5	0.75
CSE 4581	Web Programming	3-0-0	3.00
CSE 4582	Web Programming Lab	0-0-1.5	0.75
CSE 4583	Relational Database Concepts	3-0-0	3.00
CSE 4584	Relational Database Concepts Lab	0-0-1.5	0.75
CSE 4585	Computer Networks	3-0-0	3.00
CSE 4586	Computer Networks Lab	0-0-1.5	0.75

2nd Semester

L = Lecture. P = Practical / Workshop T = Tutorial

Course Number	Course Title	Contract Hours	Credit Hours
		L – T - P	
Math 4629	Engineering Mathematics II	3-0-0	3.00
CSE 4673	Operating System and System Programming	3-0-0	3.00
CSE 4574	Operating System and System Programming Lab	0-0-1.5	0.75
CSE 4671	Wireless and Mobile Communication	3-0-0	3.00
CSE 4572	Wireless and Mobile Communication Lab	0-0-1.5	0.75
CSE 4675	Mobile Application Development	0-0-3	3.00
CSE 4676	Mobile Application Development Lab	0-0-1.5	0.75

3rd Semester (2-Yr)

L = Lecture. P = Practical / Workshop T = Tutorial

Course Number	Course Title	Contract Hours	Credit Hours
		L – T - P	
CSE 4700	Project and Thesis	3-0-0	3.00
CSE 4773	Internetworking Protocols	3-0-0	3.00
CSE 4774	Internetworking Protocols Lab	0-0-1.5	0.75
CSE 4775	Introduction to Data Mining	0-0-3	3.00
CSE 4781	Geographical Information Systems	3-0-0	3.00

CSE 4782	Geographical Information Systems Lab	0-0-1.5	0.75
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Note: Any two technical courses will be taken from above list.

4th Semester (2-Yr) & 2nd Semester (1-Yr)

L = Lecture. P = Practical / Workshop T = Tutorial

Course Number	Course Title	Contract Hours	Credit Hours
		L – T - P	
CSE 4800	Project and Thesis	3-0-0	3.00
CSE 4873	IT Project Management	3-0-0	3.00
CSE 4874	IT Project Management Lab	0-0-1.5	0.75
CSE 4885	Human Computer Interaction	0-0-3	3.00
CSE 4887	Computer Graphics	3-0-0	3.00
CSE 4788	Computer Graphics Lab	0-0-1.5	0.75

Note: Any two technical courses will be taken from above list.

B.Sc.T.E. (1-Yr) Program (HD Stream)

1st Semester (1-Yr)

L = Lecture. P = Practical / Workshop T = Tutorial

Course Number	Course Title	Contract Hours	Credit Hours
		L – T - P	
CSE 4700	Project and Thesis	3-0-0	3.00
CSE 4777	IT Project Management	3-0-0	3.00
CSE 4778	IT Project Management Lab	0-0-1.5	0.75
CSE 4775	AI and Expert Systems	0-0-3	3.00
CSE 4776	AI and Expert Systems Lab	0-0-1.5	0.75
CSE 4773	Internetworking Protocols	3-0-0	3.00
CSE 4774	Internetworking Protocols Lab	0-0-1.5	0.75
CSE 4779	Introduction to Data Mining	3-0-0	3.00
CSE 4781	Geographical Information System	3-0-0	3.00
CSE 4782	Geographical Information System Lab	0-0-1.5	0.75

Note: Any two technical courses will be taken from above list.

4th Semester (2-Yr) & 2nd Semester (1-Yr)

L = Lecture. P = Practical / Workshop T = Tutorial

Course Number	Course Title	Contract Hours	Credit Hours
		L – T - P	
CSE 4800	Project and Thesis	3-0-0	3.00
CSE 4873	IT Project Management	3-0-0	3.00
CSE 4874	IT Project Management Lab	0-0-1.5	0.75
CSE 4885	Human Computer Interaction	0-0-3	3.00
CSE 4887	Computer Graphics	3-0-0	3.00
CSE 4788	Computer Graphics Lab	0-0-1.5	0.75

Note: Any two technical courses will be taken from above list.

CSE Courses for B.Sc.T.E. 2-Yr 1st Semester

Math 4529 Engineering Mathematics I 3-0-0 Credit Hours 3.00

Vector analysis: Triple products, their geometric interpretation and application. Differentiation and integration of vectors Line, surface, and volume integrals. Gradient, divergence, curl, and their physical significance. Green's theorem, Stoke's theorem. Divergence theorem and their applications.

Statistics and elementary quality control: Correlation. Regression, Elementary probability theory. Binomial, Poisson and Normal distribution. Tests of hypothesis. Application of elementary quality control to practical problems.

Laplace Transform: Definition, elementary transformation and properties. Solution of differential and integro-differential equations using Laplace transformation and simple applications to circuit problems.

CSE 4573 Microprocessor and Assembly Language Programming 3-0-0 Credit Hours 3.00

Microprocessor and Assembly Language: Microprocessors and Microcomputers, Evaluation of Microprocessors Applications, Intel 8086 Microprocessor: internal architecture, register structure, programming model, addressing modes, instruction set, Assembly language programming, Coprocessors. An overview of Intel 80186, 80286, 80386, 80486 and Pentium microprocessors, and RISC processors.

Text book:

1. Intel Microprocessors: Berry B. Brey
2. Intel Microprocessors: Douglas V. Hall
3. Microprocessor and Assembly Language Programming: Charles E. Marut

CSE 4574 Microprocessor and Assembly Language Programming Lab 0-0-1.5 Credit Hours 0.75

Sessional works based on CSE 4573

CSE 4581 Web Programming 3-0-0 Credit Hours 3.00

Introduction: The Internet model, Web browsers, Useful tools, Layers of the Internet World Wide Web, Domain Name Service, Uniform Resource Locator, Overview of Web Applications.

Sessional works based on CSE 4583

CSE 4585 Computer Networks

3-0-0

Credit Hours 3.00

Introduction to computer networks, Uses of computer networks, Network models, Network topology, Layered approach of networking protocols, Design issues of layers, and TCP/IP protocol suite.

Data link layer: Design issues; error control, detection and correction; Logical link control sub-layer, Medium access sub-layer; Multiple access protocols, Medium access mechanisms – ALOHA, slotted ALOHA, CSMA, CSMA/CD, CSMA/CA, WDMA; Medium access protocols – IEEE 802.3: Ethernet, IEEE 802.4: Token bus, IEEE 802.5: Token ring, Introduction to WiFi; High speed LANs, FDDI, Fast Ethernet, and Gigabit Ethernet; LAN extension – Bridges, Switches, and VPN, Network layer: IP addressing, IP packet forwarding, Subnetting, CIDR, Internet protocol, ICMP, ARP, RARP, DHCP, and IPv6 overview; Routing protocols -

Transport layer: Functionalities; User datagram protocol (UDP) – UDP operations and UDP package modules, Transmission control protocol (TCP) – TCP features, TCP Connection establishment and termination, TCP Flow control and error control, Congestion control.

Application layer: DNS, Electronic mail (SMTP, POP, IMAP), FTP, WWW.

Text books:

1. Data Communications and Networking, Author: Behrouz A Forouzan
2. Computer Networks a System Approach, Author: Larry L. Peterson and Bruce S. Davie
3. Computer Networks, Author: Tanenbaum A S

CSE 4586 Computer Networks Lab

0-0-1.5

Credit Hours 1.5

Sessional works based on CSE 4585

2nd Semester

Math 4629 Engineering Mathematics II

3-0-0

Credit 3.00

Contents: Complex Variable: Introduction to complex variable. Complex differentiation and integration. Calculus of residues. Contour integration and conformal mapping.

Fourier Series: Fourier series expansion, evaluation of Fourier co-efficients, full range and half range series. Odd and even functions, harmonic analysis.

Numerical Analysis: Solution of polynomial equation and equation involving transcendental functions. Newton's forward and backward interpolation formulas. Runge-Kutta method. Numerical integration, Simpson's rule and trapezoidal rule. Advanced programming and numerical techniques and their application to engineering problems.

CSE 4673 Operating System and System Programming 3-0-0 Credit Hours 3.00

Introduction to O.S., evaluation of Operating Systems. Memory management: memory addressing, paging & storage multiplexing, virtual memory, Processing memory: process state, concurrent processing, synchronization, process scheduling, Deadlocks & its handling, protection system. Performance evaluation.

Basic concepts of system programming, assembler, compiler, loader, technical design of assembler and compiler.

Text books:

1. Operating System Concepts, Author: Silberchatz
2. Modern Operating Systems, Author: Tanenbaum A S, Prentice Hall, 1992
3. Operating Systems: Internals and Design Principles" by William Stallings

CSE 4674 Operating System and System Programming Lab 0-0-1.5 Credit Hours 0.75

Sessional works based on CSE 4673

CSE 4671 Wireless and Mobile Communication 3-0-0 Credit Hours 3.00

Wireless Communication: Radio transmission, Microwave transmission, Infrared & millimeter waves, Lightwave transmission.

Fundamental concepts in mobile systems: Cellular systems, channel assignment, power control, propagation and fading, hand-off.

Signal modulation: Wireless channel characteristics and diversity techniques, modulation schemes used in mobile systems

Systems and standards: second generation cellular network: GSM, CDMA, GPRS, EDGE, third generation wireless network: cdma2000, W-CDMA, TD-SCDMA

Selected topics on modern wireless systems: Mobile IP and Wireless IP Multicasting, Ad-hoc Networks and Bluetooth Technology, Wireless Application Protocol (WAP), Security in Wireless Networks.

Text books:

1. Wireless Communications: Principles and Practice, Author: Theodore S. Rappaport
2. Fundamentals of Wireless Communication, Author: David Tse, Pramod Viswanath
3. Wireless Communications, Author: Andrea Goldsmith

4. Wireless & Mobile Network Architectures Author: Yi bing Lin

CSE 4672 Wireless and Mobile Communication Lab 0-0-1.5 Credit Hours 0.75

Sessional works based on CSE 4671

CSE 4675 Mobile Application Development 0-0-3 Credit Hours 3.00

Basic concepts: Mobile computing; Mobile computing architecture, Mobile technologies, Anatomy of a mobile device, Applications of mobile computing, Technical issues for mobility, Mobile agents and process migration.

Introduction to Mobile Development Frameworks and Tools: Fully Centralized Frameworks and Tools, N-Tier Client–Server Frameworks and Tools, J2ME, WAP, Symbian EPOC, iPhone, Android, Windows CE.

Android application development: Getting started with android programming, Android architecture, Application framework and libraries, Android runtime, Linux kernel, Android user interface, Data persistence, Messaging and networking, Location Based Services, Developing android services, Android application publishing

The User Experience: The Small Screen Problem, The Unified Look and Feel Paradigm, The iPhone Human Interface Guidelines, The Blackberry User Interface Guidelines, Common User Interface Guidelines,

Security Issues in mobile computing: Security threats, Ensuring consistency and reliability.

The Future of Mobile Computing: Upcoming Technologies, Convergence of Media and Communication Devices.

Text books:

1. Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML, Cambridge University Press, 2004.
2. Mobile Computing: Theory and Practice: Author: Garg Kumkum
3. Beginning Android Application Development (Wrox Programmer to Programmer), Wrox Press, 2011.
4. Android Application Development: Programming with the Google SDK, O'Reilly, 2009.
5. App Inventor: Create Your Own Android Apps - David Wolber , Hal Abelson, Ellen Spertus, Liz Looney.
6. Wireless Java: Developing with J2ME, 2/e, Jonathan Knudsen, ISBN: 1-59059-077-5, Apress, 2003.

7. Programming Mobile Devices: An Introduction for Practitioners - Tommi Mikkonen, Wiley, 2007.

CSE 4676 Mobile Application Development Lab **0-0-1.5** **Credit Hours 0.75**

Sessional works based on CSE 4675

3rd Semester

CSE 4700* Project and Thesis **3-0-0** **Credit 3.00**

CSE 4773 Internetworking Protocols **3-0-0** **Credit 3.00**

Introduction to wireless networks, wireless media, overview of Internet technology, Internet services, electronic mail, UseNet, SNMP, SMTP, URL, URI, HTTP, MIME and WWW.

Multi access protocols; Aloha, CSMA and its variations, token ring; error control techniques, flow and congestion control, window and rate based schemes, TCP. ATM, ABR, hop-by-hop schemes, quality of service: in ATM, IETF integrated services model, differentiated services model, mobile IP, data link layer protocols; routing algorithms and protocols, multicast: IGMP, PIM, DVMRP, spanning tree protocol.

Overview of IEEE 802.11(e/g/h/ac): standard for Wireless Local Area Networks (WLANs), IEEE 802.15: standard for Wireless Personal Area Networks (WPANs), IEEE 802.15.1: standard for Bluetooth, IEEE 802.15.4: standard for ZigBee, IEEE 802.15.5: standard for Mesh Network, IEEE 802.16: standard for Wireless Metropolitan Area Networks (WMANs), IEEE 802.15.5: standard for Mobile Broadband Wireless Access, wireless ATM networks, voice over IP (VoIP), Mobile IP, Internet using mobile phones, roaming algorithms, handover techniques, satellite communications.

Text Books:

1. A.S. Tanenbaum, "Computer Networks", 4th Edition, Prentice Hall, 2002
2. W. Stallings, "Data and Computer Communications", 6th Edition, Prentice Hall, 2000
3. F. Halsall, "Data Communications, Computer Networks and Open Systems", 4th Edition, Addison-Wesley, 1996
4. C. Huitema, "Routing in the Internet", 2nd Edition, Prentice Hall, 1999
5. W.R. Stevens, "TCP/IP Illustrated Volume 1: The Protocols", Addison Wesley, 1994.
6. D. Comer, "Internetworking with TCP/IP Volume 1: Principles Protocols, and Architecture", 4th Edition, Prentice Hall, 2000
7. J.F. Kurose, K.W. Ross, "Computer Networking: A Top-Down Approach Featuring the Internet", 3rd Edition, Addison-Wesley 2004.

CSE 4774 Internetworking Protocols Lab**0-0-1.5****Credit 0.75**

Sessional works based on CSE 4773.

CSE 4775 Introduction to Data Mining**3-0-0****Credit 3.00**

Database design and ER diagram. Storage and file structure in RDBMS. Strength and limitations of RDBMS. Application scenario where conventional database system is inefficient. Introduction to Data Mining. Data Objects and Attribute Types. Statistical tools for Data Mining. Data preprocessing. Data warehousing and Online Analytical Processing. Data cube in details. Frequent patterns, Associations and Correlations.

Text books:

1. DATABASE SYSTEM CONCEPTS (6/e). BY: SILBERSCHATZ · KORTH · SUDARSHAN
2. Data Mining Concepts and Techniques (3/e). By: Han et al.

CSE 4781 Geographical Information Systems**3-0-0****Credit 3.00**

The subject aims to introduce students to the key basic principles and techniques used in the development of geographical information systems. It has a particularly strong focus on the application of GIS in practice and the evolution of approaches to their development and use. The main topics addressed include introduction to GIS concepts, basic hardware, software and data requirements for GIS development, evolution of GIS technology, key areas of application of GIS in practice, issues in the management of GIS, the organizational role of GIS, and emerging trends in GIS development and usage.

CSE 4782 Geographical Information Systems Lab**0-0-1.5****Credit 0.75**

Sessional works based on CSE 4781

4th Semester**CSE 4800* Project and Thesis****3-0-0****Credit 3.00****CSE 4873 IT Project Management****3-0-0****Credit 3.00**

Project Planning: Negotiating techniques, Uncovering requirements, Crafting the WBS

Advanced Techniques: Risk management, Estimating time & cost, Team Motivation

Working with MS Project: Optimized schedules, Fine-tuning, Spotting problems early

Using Templates: Work packages, WBS decomposition, Risk analysis

Text books:

1. Managing Information Technology Projects, Author: Dick Billows
2. Essential of Project Management, Author: Dick Billows
3. Fundamentals of management Author: Stephen P. Robbins, David A. Decenzo
4. Project, Planning, Analysis, Financing, Implementation and Review Author: Prasanna Chandra

CSE 4874 IT Project Management Lab.

0-0-1.5

Credit 0.75

Sessional works based on CSE 4873

Recommended Material:

1. Microsoft Project

CSE 4885 Human Computer Interaction

3-0-0

Credit 3.00

Contents: Foundations, The Human: Input-output channels, Human memory, Thinking: Reasoning and problem solving, individual Differences, Psychology and the Design of interactive Systems.

The Computer: Text Entry Devices, Output Devices, Memory, Paper : Printing and scanning, processes.

The Interaction : Models of Interaction, Frameworks and HCI, Ergonomics, Interaction styles, The context of the Interaction.

Design Practice: Paradigms for interaction, Principles to support Usability, Using Design Rules, Usability Engineering, Interactive Design and Prototyping, Modules of the user in Design: Cognitive Models, Goal and Task Hierarchies, Linguistic Models. The challenges of Display Based Systems, cognitive Architectures; Task Analysis: Task Decomposition, Knowledge Based Analysis, E-R Based Techniques, Sources Information and Data Collection, Uses of Task Analysis. Dialogues Notations and Design: Dialogue Notations, Textual Dialogue Notations, Dialogue Semantics, Dialogue Analysis and Design; Models of the System: Standard Formalisms, Interaction Models, Status/Event Analysis; Implementation Support; Evaluation Technique; Help and Documentation: Requirements of user support, Approaches to user support, Intelligent help Systems.

Groupware : Groupware systems, Meeting and Decision support systems, Framework for Groupware.

CSCW Issues and Theory : Face to Face Communication, conversation.

Multi-sensory Systems : Usable sensory Inputs, speech in the interface, Handwriting Recognition; Text Hypertext and Hypermedia; Gesture Recognition, Computer Vision, Application of Multimedia Systems.

Recommended Text:

1. Human-Computer Interaction, Author: Alan Dix, Janet Finlay

CSE 4887 Computer Graphics

3-0-0

Credit Hours 3.00

Introduction to computer graphics: brief history, applications, hardware and software and the fundamental ideas behind modern computer graphics.

1. Microsoft Project

CSE 4775 AI and Expert Systems

3-0-0

Credit 3.00

Survey of concepts in artificial intelligence. Knowledge representation, search and control techniques. All machines and features of the LISP and PROLOG languages. Problem representation: search, inference and learning in intelligent systems; systems for general problems solving, game playing, expert consultation, concept formation and natural language procession: recognition, understanding and translation. Case Study on Expert Systems.

Recommended text:

1. Artificial Intelligence: A Modern Approach, Author: Stuart Russell and Peter Norvig

CSE 4776 AI and Expert Systems Lab

0-0-1.5

Credit 0.75

Sessional works based on CSE 4775

CSE 4773 Internetworking Protocols

3-0-0

Credit 3.00

Introduction to wireless networks, wireless media, overview of Internet technology, Internet services, electronic mail, UseNet, SNMP, SMTP, URL, URI, HTTP, MIME and WWW.

Multi access protocols; Aloha, CSMA and its variations, token ring; error control techniques, flow and congestion control, window and rate based schemes, TCP. ATM, ABR, hop-by-hop schemes, quality of service: in ATM, IETF integrated services model, differentiated services model, mobile IP, data link layer protocols; routing algorithms and protocols, multicast: IGMP, PIM, DVMRP, spanning tree protocol.

Overview of IEEE 802.11(e/g/h/ac): standard for Wireless Local Area Networks (WLANs), IEEE 802.15: standard for Wireless Personal Area Networks (WPANs), IEEE 802.15.1: standard for Bluetooth, IEEE 802.15.4: standard for ZigBee, IEEE 802.15.5: standard for Mesh Network, IEEE 802.16: standard for Wireless Metropolitan Area Networks (WMANs), IEEE 802.15.5: standard for Mobile Broadband Wireless Access, wireless ATM networks, voice over IP (VoIP), Mobile IP, Internet using mobile phones, roaming algorithms, handover techniques, satellite communications.

Text Books:

1. A.S. Tanenbaum, "Computer Networks", 4th Edition, Prentice Hall, 2002
2. W. Stallings, "Data and Computer Communications", 6th Edition, Prentice Hall, 2000
3. F. Halsall, "Data Communications, Computer Networks and Open Systems", 4th Edition, Addison-Wesley, 1996
4. C. Huitema, "Routing in the Internet", 2nd Edition, Prentice Hall, 1999
5. W.R. Stevens, "TCP/IP Illustrated Volume 1: The Protocols", Addison Wesley, 1994.
6. D. Comer, "Internetworking with TCP/IP Volume 1: Principles Protocols, and Architecture", 4th Edition, Prentice Hall, 2000
7. J.F. Kurose, K.W. Ross, "Computer Networking: A Top-Down Approach Featuring the Internet", 3rd Edition, Addison-Wesley 2004.

CSE 4774 Internetworking Protocols Lab

0-0-1.5

Credit 0.75

Data Compression Techniques: JPEG; H.261 (px64); MPEG; Intel's DVI; Microsoft AVI; Audio compression; Fractal compression

Text books:

1. Introduction to Computer Graphics, Author: Foley J D and others
2. Computer Graphics, Author: Angel E
3. Computer Graphics, Author: Hearn D and Baker M P

CSE 4888 Computer Graphics Lab

0-0-1.5

Credit Hours 0.75

Sessional works based on CSE 4887