

BANGLADESH UNIVERSITY OF PROFESSIONALS

Prospectus

For

**Master in Information and Communication Technology
(MICT)**

Dept. of Information and Communication Technology (ICT)

Faculty of Science and Technology (FST)

Mirpur Cantonment, Dhaka-1216

Website: www.bup.edu.bd

Table of Contents

Contents	Page No
Chapter- I: Brief on Bangladesh University of Professionals (BUP)	
Faculty of Science and Technology (FST)	
1. Introduction	1
2. Vision of BUP	1
3. Mission of BUP	1
4. Core Values	1
5. Objectives of BUP	2
6. Location and Campus	2
7. Academic Environment	2
8. Faculties of BUP	2
9. Strengths of the Faculty	3
10. Regulatory Bodies	3
11. Administration	3
12. BUP Library	4
13. Cafeteria	4
14. Auditorium	4
15. Prayer Room	4
16. Medical Centre	5
17. Interested in Applying?	5
 Chapter- II: Rules and Regulations for Master degree in Information and Communication Technology	
1. Degrees Offered	6
2. Admission Procedures	6-9
3. Academic Regulations	9
4. Transfer of Credits	11
5. Grading system	11-13
6. Conduct of Examination	14
7. Qualifying Requirements	14
8. Thesis	15
9. Project	16-17
10. Striking off and removal of names from the rolls	18-20
11. Academic fees	11-22

12. Refund of Fees	.....	22
13. Dress Code		

Chapter -III: Courses in Information and Communication Technology Program

1. Semester-wise Credit Hour distribution	.....	25
2. Syllabus and Credit Hours	.....	25
3. Core Course Pre-requisite	.....	26
4. Course Curriculum	.....	28-36

Chapter- I

Brief on

BANGLADESH UNIVERSITY OF PROFESSIONALS (BUP)

Faculty of Science and Technology (FST)

1. Introduction

Bangladesh University of Professionals (BUP) is one of the newest Public Universities of the country established on June 05, 2008 with the motto of achieving “Excellence through knowledge”. It is the only public university in Bangladesh administered by the Armed Forces. The Faculty of Science and Technology (FST) under BUP started its activity in full swing from the early 2012. BUP with its own unique features set up in a green landscape away from the busy life of metropolitan city. The university promises to provide the best possible congenial academic atmosphere. BUP welcomes those students who will dedicate their total attention and devotion to serious academic pursuits to build up better tomorrows for the nation. BUP is the only educational entity in the country where there is an opportunity of blending between civil students and uniformed Armed Forces students with diversified skills, exposure, experience and outlook. Chapter- I introduces BUP in brief and Chapter– II contains rules and regulations of this course and Chapter– III orients with the detail of course.

2. Mission of BUP

To develop the civil and military human capital through advanced education and research to respond to the knowledge-based society of the contemporary world.

3. Vision of BUP

Bangladesh University of Professionals will emerge as a leading university for both professionals and general students through need-based education and research with global perspective.

4. Core Values

Integrity: Highest ethical and moral uprightness.

Discipline: Strict discipline in all activities.

Creativity: Creativity in all spheres.

Commitment: High quality academic standards.

Wisdom: Enhanced education and research.

5. Objectives of BUP

- To become a leading public university in Bangladesh and in the region.
- To promote knowledge in the field of science and technology, business, medicine, social science, strategy and security.
- To promote leadership and civil-military relationship.
- To develop intellectual and practical expertise.
- To provide the best possible academic atmosphere.
- To preserve the spirit of national culture, heritage and traditions.
- To facilitate higher education in the Armed Forces.
- To prepare the Faculty and Staff with necessary competencies.
- To deliver competent professionals relevant to the demands of the society.
- To sustain collaborative relationships with communities and educational partners.
- To provide efficient services to support programs, campus, campus community and quality of life.

6. Location and Campus

BUP is located at Mirpur Cantonment and a short walk from the MIST. The campus is easily accessible by road either from Mirpur-10 round-about or Hotel Radisson Dhaka turningpoint. Faculties and administrative buildings are adjacent which facilitates supportive academic atmosphere. The green landscape includes a natural lake providing an obligatory space to breathe fresh air. The charming scenario of the campus attracts the visitors round the year.

7. Academic Environment

The academic environment is developed based on systematic thoughts which encourage student learning. The university provides a tranquil, pollution free and secured campus life leading to a congenial academic atmosphere. Our esteemed faculty members provide an excellent opportunity for close personalized caring instruction and take the participants as far as their imagination allows. Faculty also committed to render devoted attention that pushes the students to excel and nurture.

8. Faculties of BUP

The university has five faculties to run all educational institutions of the Army, Navy and Air Force and facilitate professional degree for the Armed Forces personnel and civilian as well. It awards

undergraduate and post-graduate degrees. BUP has the authority to confer M Phil and PhD like any other public university. The faculties are:

- Faculty of Science and Technology(FST)
- Faculty of Business Studies (FBS)
- Faculty of Medical Studies (FMS)
- Faculty of Security and Strategic Studies (FSSS)
- Faculty of Arts and Social Science (FASS)

9. Strengths of the Faculty

FST has a dedicated team of professionals representing the best teaching talents and takes pride to work with the following strengths:

- a) A rigorous admission and selection process for the best possible screening.
- b) Interactive sessions in the classroom.
- c) Regular guest lecturers/Professor and visits to the concerned organizations.
- d) Developing a culture of Punctuality and Commitment amongst all.
- e) Flexibility in choosing to apart the competent faculties through outsourcing.
- f) Well thought-out and continuous feedback and assessment system.
- g) Effective teaching through innovative methods incorporating latest trends and developments in the world.
- h) Developing respect to codes of conduct including dress code.

10. Regulatory Bodies

There are different regulatory bodies and committees, which regulate the faculty and the university as a whole. These are:

10.1 Senate: The highest policy and decision making body of the university.

10.2 Syndicate: The key executive body for general management and supervision.

10.3 Academic Council: The key executive body on academic affairs of the university.

11. Administration

8.1 The administrative matters in general are centrally dealt basically by the Registrar and the Treasurer's branch of BUP.

8.2 Academic affairs of FST are controlled by Dean FST under the supervision of Vice Chancellor of BUP.

8.3 Dean FST plans and executes the academic affairs through Academic Committee composed of a group of dedicated faculty members.

8.4 The course will be conducted by the well-reputed teaching faculty members who are expert on their respective subject, supported by the competent management and administrative staffs.

12. BUP Library

Central Library serves all individuals, comprising of faculty members, students, researchers, staffs and selected members of other academic communities. Now, the library contains 2000 volumes of books and bound journals. It includes electronic copies of books and journals. Every year, lot of books is added to the present stocks. CDs and DVDs containing 3000 e Articles, 2000 e-Journals are available for the inquisitive readers. BUP Library circulation system is fully automated.

13. Cafeteria

BUP maintains a well decorated air-conditioned cafeteria 'VISTA' housed at the ground floor of the academic building for all kinds of usage. It offers healthy environment providing highly attractive ambiance and remain open for the students, academic and management staffs. Every effort is made to ensure that food items remain fresh while delivery. Cafeteria projects itself as a central attraction for relaxation and enjoying delicious snacks. In addition it sells stationary, confectionary and gift items.

14. Auditorium

BUP auditorium named as 'BIJOY AUDITORIUM' with 500 capacities in a favorite venue for intimate musical performance. Splendid classical design provides multi-purpose facilities for holding academic programs like seminar, workshop, central lecture and presentation

15. Prayer Room

Separate prayer room for both male and female is located at the 1st floor of the academic building. Well-furnished spaces with necessary facilities are kept open to value the religious sentiment of the Muslims.

16. Medical Centre

Medical centre is established at ground floor of Administrative Building to provide primary medical care who don't need admission in to a hospital. Staffed with qualified and experienced physician and compassionate paramedics it offers emergency treatment for the minor illness and injuries. Service remains open to all concern working in BUP.

17. Interested in Applying?

BUP has started its journey in the IT academic field to strengthen in materializing the dream of 'Digital Bangladesh' through introducing the Certificate course on Information System Security (CISS). Then a post graduation course named Masters in Information System Security (MISS) was introduced. Now, we are expanding by introducing Master's in Information Communication Technology (MICT) course to create some leading IT Professionals in our country. We expect this prospectus will offer you a sense of what BUP aims to achieve on successful completion of MICT course and benefit you to become a worthy member of rapidly growing diverse community based on IT. Every year admission circular is usually published in the month of September/ October. Admission test is held on November. Our invitation remains open to call (01746 564286) or email us (pgcord.missmict@bup.edu.bd), visit our website (www.bup.edu.bd) and if necessary pay a physical visit to our office (Academic Block: Room 521) for clarifying any point regarding the ensuing course/program.

Chapter- II

Rules for Master Degree in Information and Communication Technology

1. Degrees Offered:

The Master's degrees to be offered under these rules are as follows:

- 1.1 Master of Science in Information and Communication Technology abbreviated as MSc (ICT)
- 1.2 Master in Information and Communication Technology abbreviated as (MICT)
- 1.3 Any other Master Degrees of this department (DICT) approved by the Academic Council may also be offered under this ordinance.

2. Admission Procedures

2.1 Admission Requirements

For admission to the program leading to a Masters degree (M.Sc/Masters) in ICT, an applicant must have

- (a) a minimum GPA of 3.50 out of 5.00 or a first division or equivalent in any one of SSC and HSC or in equivalent examinations and must not have a GPA less than 2.50 out of 5.00 or a third division or equivalent in any of the aforementioned examinations.
- (b) at least 50% marks or a minimum GPA of 2.50 out of 4.0 or its equivalent in BSc. Engg or equivalent in the relevant branch.
- (c) In addition to the above rules, the respective Services Headquarters may determine service requirements of military students.

2.2 Admission Rules

2.2.1 For admission to the courses leading to the degree of M.Sc in ICT / MICT, an applicant must have obtained a bachelor degree or equivalent in CSE, EEE, EECE, ETE, ECE, ICT, Computer Engineering, Software Engineering or relevant engineering field from any recognized university from home and abroad.

2.2.2 For admission to the courses leading to the degree of M.Sc in ICT, an applicant must have obtained a graduation from discipline (science with subjects covered physics/Math's etc.) from any recognized university from home and abroad. (In such cases, the selected candidate *are required to undertake non-credit*

prerequisite courses at the graduate and / or postgraduate level or any training/ Course before registration. Candidate already completed minimum of 18 credit prerequisite course(not part of MSc Credit) in addition to 36 Credit referred for MSc ICT degree, needs to get an equivalence certificate from Equivalence Committee).

2.2.3 For admission to the courses leading to the degree of Master in ICT(MICT), an applicant must have obtained a graduation from discipline (Arts/Commerce/Social Science etc.) from any recognized university from home and abroad. (In such cases, the selected candidate *are required to undertake non-credit prerequisite courses* at the graduate and / or postgraduate level or any training/ Course before registration. Candidate already completed minimum of 18 credit prerequisite course (not part of MSc Credit) in addition to 36 Credit referred for MSc ICT degree, needs to get an equivalence certificate from Equivalence Committee).

2.3. Selection tests

Every year admission circular is usually published in the month of September/ October. Admission test is held on November.

(a) Selection Process:

Selection of candidates is made basing on their standing in the combined merit list. The selection process that is followed in BUP is:

1) Written Test:

All candidates are required to attend a written admission test, where he/she will have to qualify. The test covers topics from B.Sc. Engineering subjects (as decided by Academic Committee time to time) following internationally recognized standard in terms of conventions, coverage and level of difficulties. Academic Committee of MICT will also take decision whether the written test will be taken or the selection process will be done through communication test (Interview/ viva-voce).

2) Communication Test (Interview/Viva Voce):

The selected Candidates needs to appear for a communication test based on their written test result before the panel of communication test consisting of Faculty members. 15% of Total Marks will be allotted. Academic Committee may edit/ fix its percentage time to time. Preference will be given to students with MCSE/ CCNA/ CCNP/ CEH/ CISA/ CISS/CISSP/DBA etc qualified students.

3) Marks from past public examinations:

The results of past public Examinations carry 35% Marks, where 20% is from B.Sc or equivalent exams and 15% (equally divided) from HSC and SSC exams. The marks are calculated in a simple linear distribution from candidates' GPA.

4) Final Selection:

Final selection is made on the basis of merit. The merit list is prepared according to combined marks obtained by candidates in the written admission test (50% of marks Scored); score in communication (15% of marks Scored) test (interview/viva voce) and in past public examinations (35% of marks Scored).

Academic committee of MICT should decide the students selection based on the need. Students can apply for their choice in MSc in ICT/ Master in ICT. However, only candidates with BSc Engg background can give their choice in MSc in ICT. Final nomination of students will be done after completion of Core subjects, on the basis of their obtained marks in first and second semesters. Academic Committee will prepare final students list for MSc in ICT/ Master in ICT for final selection.

5) Selection of military students:

Nomination of the military students will be done by the service or Intelligence headquarters and considered as Final Selection.

Applications for admission to the above program shall be invited through regular means of advertisement and shall be received by the Admission officer/Course Co-coordinator.

Every selected candidate, unless he/she has already been registered, shall get himself/herself registered with Bangladesh University of Professionals (BUP).

2.4 Registration Procedures

After admission, course advisor will be appointed for each student by the respective Dean/ Chairman. Each student shall be assigned, by the relevant Academic Committee of MICT, an Adviser from among the teachers of the Department not below the rank of an Assistant Professor. In advance of each enrolment and course registration for any semester, the Adviser/ Supervisor/ Course Co-coordinator shall check and approve his/her student's schedule for subjects, pre-requisites as recommended by the Selection Committee and the total hours. The student is expected to consult his/her Adviser/ Supervisor/ Course Co-coordination for all academic matters but, it is the responsibility of the individual student to see that his/her schedule conforms to the academic regulations.

2.4.1 Registration deadline

Every registered student shall get himself/herself enrolled on payment of prescribed fees and other dues as per BUP rules before the commencement of each semester. In an academic year there will be normally two semesters. All course registration must be completed within two weeks from the start of a semester.

2.4.2 On the recommendation of the appropriate Academic Committee, the rules for admission into the University for master/post Graduate Studies shall be framed from time to time by the Academic Council. Academic Committee on its own may, if it deems fit, recommend such rules for admission for approval of the Academic Council.

2.4.3 Late Registration:

No late registration will be allowed after starting the courses. Late registration after the specific date may only be accepted for thesis/project or any subjects if the student submits a written appeal to the Dean, FST through the concerned Chairman of ICT department and can document extenuating circumstances such as medical problems (physically incapacitated and not able to be presented) from the Medical Officer (MO) of BUP or some other academic commitments which precluded registration prior to the last date of registration. Students will be charged a late registration fee of Tk. 1000.00 (One thousand) only. This extra fee will not be waived whatever be the reason for late registration.

2.4.4 Semester Withdrawal In Case of Illness:

If a student is unable to complete the final examination of a semester due to serious illness or serious accident or official commitment he/she may apply to the Dean, FST in a prescribed form through Chairman of ICT department for total withdrawal from the semester within a week after the end of the semester final examination. The application must be supported by a medical certificate from the MO, BUP or relevant official documents. The Academic Council will take the final decision about such application on the recommendation of the relevant Academic Council.

3. Academic Regulations

3.1 Duration of Course/Program: The minimum duration of the M.Sc. in ICT/ Master in ICT Program shall be of Two years i.e., Four Semesters. A candidate for the Masters degree must complete all the requirements for the degree within 5 (five) academic years (Session) from the date of the first admission in the program.

3.2 Academic progress shall be measured in terms of credit hours earned by a student. One credit hour subject shall normally require 16 hours of lecture for one semester; while one credit hour for thesis/project/ laboratory should normally require 48 hours of work for one semester. The number of credit hours for each subject shall be as specified in the syllabus of respective department/ Institute.

3.3 Credit Hour Requirement:

The credit hour requirement for the Masters Program shall be as follows:

- (a) For the degree of M. Sc in ICT, a student must earn a minimum of 36 credit hours

including a project for which 6 credit hours shall be assigned. (*Provided a student completed 18 non-credit pre-requisite course*)

(b) For the degree of Master in ICT, a student must earn a minimum of 42 credit hours including a project for which 12 credit hours shall be assigned. (*Provided a student completed 18 non-credit pre-requisite course*)

3.4 Distribution of Marks. The grade in the course will be based on an overall evaluation of a student's performance in presentation, assignments, examinations, quizzes, class attendance and class participation. Suggested distribution of marks in the course is given below. However, depending on the nature of course minor modifications can be done by respective course teacher, provided it is incorporated in the course outline.

Table 2: Percentage Distribution of Marks For Evaluation of Students Performance

1.	Class test (Total Three)	10 %
2.	Assignment and Case studies including Presentation	10 %
3.	Class Attendance	10 %
4.	Midterm Exam	20 %
4.	Semester Final Examination	50 %
Total		100%

3.4.1 Individual attendance and qualifying separately in the Semester Final Exam is mandatory.

3.4.2 Attempt in all other modules and written assignment is compulsory.

3.4.3 Minimum 75 percent attendance in the scheduled class is obligatory for attending the Semester Final Examination.

3.5 Categories of Students:

There shall be two categories of students, namely, full-time students and part-time students.

(I) A student may enroll as a part-time student. Students, serving in different organizations, may also be admitted as part time student with the written consent of the employer. A part time student may be assigned a minimum of 3 credit hours to a maximum of 9 credit hours of course including thesis/ project work in any semester or after completion of three semester.

(II) Full time students must register for a minimum of 12 credit hours and a maximum of 15 credit hours per semester. A full time student shall not be allowed to be in the employment of any organization (even as a part time employee). However, they may be employed as teaching/ research

assistant at the University. If a full time student becomes an employee (full time or part time) of any other organization in the middle of a semester, he/she may, with the approval of the Chairman, Department of ICT and his/her Employer, be allowed to continue as a full time student for that semester. A student may be allowed to switch from part-time to full-time or vice versa on the recommendation of the respective Academic Committee before the commencement of a semester.

3.6 The courses of study shall be as recommended by the respective Academic Committee and approved by the Academic Council. The Academic Committee may review the curriculum from time to time and recommend any changes as may be considered necessary. The courses to be offered in any semester shall also be as determined by the relevant Academic Committee.

4 Transfer of Credits:

A student on the recommendation and as approved by the Academic Committee may be allowed to transfer a maximum of 9.0 credits of the courses completed by the student at a recognized institution provided that the courses were not taken earlier than eight calendar years from the date of his/her first enrolment in the program and that the student obtained a minimum GPA of 3.0 out of 4.0 or its equivalent in such courses and that the course curriculum are equivalent to the approved courses of University.

5 Performance Evaluation System

Final grades for courses shall be recorded as follows:

Grade	Merit description	Grade points
A+	Outstanding	4.0
A	Excellent	3.75
A-	Very Good	3.50
B+	Good	3.25
B	Above Average	3.00
B-	High Average	2.75
C+	Average	2.50
C	Below Average	2.25
D	Pass	2.00
F	Failure	0.00
I	Incomplete	-----
S	Satisfactory	-----
U	Unsatisfactory	-----
W	Withdrawn	-----
X	In progress (thesis/ Project)	-----
I	Discontinued (thesis /Project)	-----

5.1. Courses in which the student gets F grades shall not be counted towards credit hour requirements and for the calculation of Grade Point Average (GPA).

5.2. Calculation of GPA

Grade Point Average (GPA) is the weighted average of the grade points obtained in all the courses passed/completed by a student. For example, if a student passes/completes five courses in a semester having credits C1, C2, C3, C4, C5 and his/her grade points in these courses are G1, G2, G3, G4, G5, respectively then

$$\text{GPA} = \frac{\sum C_i \times G_i}{\sum C_i}$$

5.3. A Numerical Example:

Suppose, a student has completed five courses in a term and obtained the following grades:

Course	Credits	Grade	Grade points
MICT1101	3	A+	4.00
MICT1102	3	B	3.00
MICT1103	3	A	3.75
MICT1104	2	B+	3.25
MICT1105	1	A-	3.50

Then his/her GPA for the term will be computed as follows:

$$\begin{aligned} \text{GPA} &= \frac{3 \times 4.0 + 3 \times 3.0 + 3 \times 3.75 + 2 \times 3.25 + 1 \times 3.50}{3 + 3 + 3 + 2 + 1} \\ &= 3.52 \end{aligned}$$

5.4 When a course is repeated for improvement, better grade shall be counted for calculation of GPA.

5.5 Performance in all the subjects including all the F grades shall be reflected in the transcript.

5.6 Grade I is given only when a student is unable to sit for the examination of a course at the end of the semester because of circumstances beyond his/her control. He/She must apply to the Chairman, Department of ICT within one week after the examination to get I grade in that course. It must be completed within the next two semesters (Provided the course is offered twice). Upon re-entry a student shall start the program from the semester he/ she took the withdrawal.

5.7 Satisfactory (S) or Unsatisfactory (U) used only as final grades for thesis/project and non-credit courses. 'X' grade shall be recorded for thesis/ project "In Progress", If, however, thesis / project is discontinued, an 'I' grade shall be recorded.

5.8 Students may enroll for non-credit course(s) termed as audit course(s) on recommendation of his/her thesis / project Supervisor and Chairman Department of ICT. Such approval should be reported to the Academic Committee.

5.9 A student shall withdraw officially from a course within two working weeks of the commencement of the semester or else his grade in that course shall be recorded as F unless he/she is eligible to get a grade of 'I'. A student may be permitted to withdraw and change his/her course within the specified period with the approval of his/her Adviser/ Course Coordinator, Chairman, Department of ICT and the respective teacher(s) concerned. (In that case his / her grade in the courses registered shall be recorded as 'W' in his Academic Record but shall not be reflected in the transcript.)

5.10 Numerical markings may be made in answer scripts, tests etc., but all final grading to be reported to the Controller of Examinations (BUP) shall be in the letter grade system as detailed below:

Percentage	Letter Grade
80% and above	A+
75% to below 80%	A
70% to below 75%	A-
65% to below 70%	B+
60% to below 65%	B
55% to below 60%	B-
50% to below 55%	C+
45% to below 50%	C
40% to below 45%	D
Below 40%	F

6. Conduct of Examination

6.1 In addition to tests, assignments and/ or examinations during the semester as may be given by the teacher(s) concerned, there shall be a written examination and / or other tests for each of the subjects offered in a semester at the end of that semester, the dates of which shall be announced by the department as advised by Dean of the respective faculty in coordination with BUP at least two weeks before the commencement of the examination. The final grade in a subject shall be based on

the performance in all tests, assignments and / or examinations.

6.2 The department and BUP shall keep up to-date record of all the grades obtained by a student in individual Academic Record Card. Grades shall be announced by the Controller of Examinations at the end of each semester. In addition, each student is entitled to one official transcript of the University record at the completion of his academic program from the office of the Controller of Examinations on production of statement of clearance from all departments' offices.

6.3 The Chairman, Department of ICT shall propose the names of the examination question paper setters, moderators and examiners for the semester examinations at least two weeks before the date of commencement of the examination to the Academic Committee for approval.

7. Qualifying Requirements

7.1 The qualifying requirement for graduation is that a student must earn a minimum grade point of 2.5 based on the weighted average in his course work.

(a) Two courses may be repeated for improvement with the prior approval of the Chairman, Department of ICT/ Dean on the recommendation of the Supervisor / Advisor/ Course Coordinator. Such approval shall be reported to the Academic Committee.

(b) A student obtaining F grade in a course may be allowed to repeat the course with the prior approval of Chairman, Department of ICT/ Dean on the recommendation of the Supervisor / Advisor. Such approval shall be reported to the Academic Committee.

7.2 A student failing to obtain and maintain a GPA or CGPA of 2.5 in the final semester or at the end of the final semester shall be allowed to repeat course(s) of the final semester in which he/she has earned 'C' grade or below. This opportunity should be taken once only. Even after repeating the course(s), if a student fails to raise GPA or CGPA to 2.5 in the final semester or at the end of final semester, will be withdrawn from the program.

7.3 In addition to successful completion of course works every student shall submit a thesis on his research work or a report on his/her project work, fulfilling the requirements as detailed in the following sections.

8. Thesis

8.1. Research work for a thesis shall be carried out under the supervision of a full-time member of the staff belonging to the relevant department/ Institute of BUP/MIST/BUET/any other university

recognized by UGC. However, in special cases, a full-time member of the staff belonging to a department outside ICT may be appointed as Supervisor, if the research content of the thesis is within the field of specialization of the member of the staff. A Co-supervisor from within or outside the department may be appointed, if necessary. The thesis proposal of a student shall be submitted for approval of the Academic Committee after completion of at least 12 credit hours of course work.

8.2 If any change is necessary of the approved thesis (title, content, cost, Supervisor, Co-supervisor etc.) it shall be approved by the Academic Committee.

8.3 The research work must be carried out in BUP or at a place(s) recommended by the Academic Committee. The work schedule and financial involvement should be mentioned in the research proposal for carrying out research work outside the University.

8.4 Every student shall submit to the Chairman, Department of ICT/ Dean, through his/her Supervisor, required number of type written copies of his/her thesis in the approved format on or before a date to be fixed by the Supervisor concerned in consultation with the Chairman, Department of ICT/ Dean.

8.5 The student shall certify that the research work was done by him/her and that this work has not been submitted elsewhere for the award of any other diploma or degree.

8.6 The thesis should demonstrate an evidence of satisfactory knowledge in the field of research undertaken by the student.

8.7 Every student submitting a thesis in partial fulfillment of the requirements of a degree, shall be required to appear at an oral examination, on a date or dates fixed by the Supervisor concerned in consultation with the Chairman, Department of ICT and must satisfy the examiners that he/she is capable of intelligently applying the results of this research to the solution of problems, of undertaking independent work, and also afford evidence of satisfactory knowledge related to the theory and technique used in his/her research work.

8.8 Examination Board

(a) An Examination Board for every student for thesis and oral examination shall be approved by the Head on recommendation of the thesis Supervisor in consultation with the Chairman, Department of ICT and to be forwarded to Dean for final approval. The Supervisor shall act as the Chairman and

the Chairman, Department of ICT will be an ex-officio member of the Examination Board. The Board shall consist of at least four members including the Chairman, Department of ICT and the Supervisor.

The Examination Board shall be constituted as follows:

i. Supervisor	Chairman
ii. Co-supervisor (if any)	Member
iii. Chairman, Department of ICT (Ex-officio)	Member
iv. One or two members from within the Department	Member
v. One external member from outside the student relevant institute/ Department	(External)

(b) If any examiner is unable to accept the appointment or has to relinquish his/her appointment before the examination, Dean, FST shall appoint another examiner in his/her place, on suggestion from the Supervisor in consultation with the Chairman, Department of ICT. This appointment will be reported to the Academic Committee.

(c) In case a student fails to satisfy the Examination Board in thesis and /or oral examination, the student shall be given one more chance to resubmit the thesis and/or appear in oral examination as recommended by the Board.

9. Project

9.1 Project work shall be carried out under the supervision of a full-time member of the staff belonging to the relevant department of BUP/ MIST/ BUET/ any other university recognized by UGC. However, in special cases, a full-time member of the staff belonging to a department outside may be appointed as Supervisor, if the research content of the project work is within the field of specialization of the member of the staff. The title of the project, cost and the Supervisor shall be recommended by the Academic Committee for approval which will be reported to the Dean, FST. The project proposal of a student shall be submitted for approval of the Academic Committee after completion of minimum 18 Credits.

9.2 If any change is necessary of the approved thesis (title, content, cost, Supervisor, Co-supervisor etc.) it shall be approved by the Academic Committee.

9.3 The project work must be carried out in BUP or at a place(s) approved by the Dean FST or recommended by the Academic Committee. The work schedule and financial involvement should be

mentioned in the project proposal for carrying out project work outside the BUP.

9.4 Every student shall submit to the Chairman, Department of ICT, through his/her Supervisor, required number of type written copies of his/her project report in the approved formation or before a date to be fixed by the Supervisor concerned in consultation with the Chairman, Department of ICT.

9.5 The student shall certify that the research work was done by him/her and that this work has not been submitted elsewhere for the award of any other diploma or degree.

9.6 Submission of Project:

Every student submitting a project report in partial fulfillment of the requirement of a degree shall be required to appear at an oral examination, on a date or dates fixed by the Supervisor concerned in consultation with the Chairman, Department of ICT and must satisfy the examiners that he/she has gained satisfactory knowledge related to the project work.

9.7 Examination Board for Project:

An Examination Board for every student for the project and oral examination shall consist of at least three members including the Supervisor. The Supervisor shall act as the Chairman. The Academic Committee shall recommend the names of the examiners for approval of Dean FST. The Examination Board shall be constituted as follows:

- (i) Supervisor : Chairman
- (ii) One member from within the Department : Member
- (iii) One member from within or outside the Department : Member (External)

If any examiner is unable to accept the appointment or has to relinquish his/her appointment before the examination, Dean FST shall appoint another examiner in his/her place on the recommendation of the relevant Academic Committee.

(c) In case a student fails to satisfy the Examination Board in project report and /or oral examination, the student shall be given one more chance to resubmit the project report and/or appear in oral examination as recommended by the Board.

9.9 Thesis Lifecycle for Effective Management

- (1) Submission of Proposal -Notice will be given for 2nd semester students after 8 weeks and must be submitted within 2 weeks.
- (2) Supervisor confirmed-With in October .
- (3) Presentation of Title Confirmation - Notice given beginning of November and has to present a presentation on last November
- (4) Follow-up form filling and submission – Every month twice.
- (5) Follow-up of Phase 1 – Present 1st progress presentation June 1st week.
- (6) Follow-up of Phase 2 – Present 2nd progress presentation October 1st week
- (9) Pre-defense – October last week
- (10) Final defense – November last week

9.10 Project Lifecycle for Effective Management

- (1) Submission of Proposal -Notice will be given for 3rd semester students after 8 weeks and must be submitted within 2 weeks.
- (2) Supervisor confirmed-With in March .
- (3) Presentation of Title Confirmation - Notice given beginning of April and has to present a presentation on last April.
- (4) Follow-up form filling and submission – Every month twice.
- (5) Follow-up of Phase 1 – Present 1st progress presentation September 1st week.
- (6) Follow-up of Phase 2 – Present 2nd progress presentation November 1st week
- (9) Pre-defense – November last week
- (10) Final defense – December 1st week

10. Striking off and removal of names from the rolls

10.1 The name of the student shall be struck off and / or removed from the rolls of the university on the following grounds:

- (i) Non-payment of dues within prescribed period.
- (ii) Failing to proceed with the program by the exercise of the Art. 3.1, 7.2 of this book.
- (iii) Failing to make satisfactory progress in his/her program as reported by the supervisor through the Academic Committee.
- (iv) Forced to discontinue his/her studies by the Committee of Discipline.

10.2 Students Withdrawal Policy:

MICT program run by Faculty of Science and Technology (FST) require persistent hard work by the students throughout the program duration. Few students may face difficulties in keeping pace with quality requirements of the programs. University will have no option other than withdrawing unsuccessful students to ensure quality education. Despite the academic standing of a student, he/she may be dismissed from the program on disciplinary ground. A student may also be allowed to withdraw on own accord subject to the approval of Academic Council of BUP.

Definitions

Few related definitions will help understanding the withdrawal policy in a better way. The definitions are given below:

- a. **Withdrawal.** The term ‘Withdrawal’ will imply a complete discontinuity from the program of the university.
- b. **Temporary Withdrawal.** The term Temporary Withdrawal means that the student has been allowed by the Academic Council, BUP to discontinue temporarily. The student, so withdrawn, may re-enter the course as per terms and conditions set by the authority.
- c. **Permanent Withdrawal.** The term ‘permanent withdrawal’ means a permanent, voluntary discontinuity from the program. The implication of permanent withdrawal includes cancellation of admission and expiry of registration. Once a student is permanently withdrawn, he/she will require a readmission and fresh registration to re-enter in the program.
- d. **Expulsion.** The term ‘Expulsion’ means expulsion from the university on disciplinary ground. A student, if expelled, will never be allowed to re-enter the course or similar programs in BUP and be subjected to other terms and conditions as set by the authority while approving the expulsion order.
- e. **Temporary Expulsion.** The term ‘Temporary Expulsion’ means expulsion from an academic program for a certain period on disciplinary ground. A student, if expelled temporarily, may be allowed to re-enter the course/program on expiry of the punishment period and on fulfillment of other terms and conditions (if any) set by the authority while approving the temporary expulsion order.
- f. **Dismissal.** The term dismissal means a permanent, forced withdrawal from the ongoing program. The implication of dismissal includes cancellation of an admission and expiry of registration. Once a student is dismissed, he/she will require a readmission and fresh registration to re-participate in the program.

10.5. **Withdrawal on Own Accord.**

(1) **Temporary Withdrawal.** A student who has already completed some courses and has not performed satisfactorily or for any other personal reasons may apply for a temporary withdrawal. Academic Council may allow a student to take temporary withdrawal from a course or the program due to sickness or any other reason and exigency. A student must hold minimum CGPA of 2.5 in 4.00 point rating scale for MICT Program at that point of time. Temporary withdrawal from the first semester of the programs is not allowed. The student must apply for such temporary withdrawal within one week (for MICT Program) from the beginning of the semester for any reason other than sickness. However, for extreme emergencies including sicknesses, a student may apply for temporary withdrawal any time during the semester. Upon re-entry, a student must complete the required courses of the program remaining in force. The student can only be accommodated within the course offered for the regular students. A student however, must complete the program within valid registration period from the date of initial registration after which his/ her registration will be cancelled.

(2) **Permanent Withdrawal.** A student may apply for a permanent withdrawal due to poor academic performance, sickness, or any other reason in any semester. If approved by academic Council, his/her admission and registration will be cancelled.

10.6 **Dismissal on Disciplinary Ground.**

(1) **Unfairmeans.** Adoption of unfair means may result in the dismissal of a student from the program and expulsion from the university subject to the decision of the BUP disciplinary committee. Following would be considered as unfair means adopted during Examinations and other contexts:

- (a) Communicating with fellow students for obtaining help in the examination.
- (b) Copying from another student's script/paper/report.
- (c) Copying from desk or palm of a hand or from other incrimination documents.
- (d) Possession of any incriminating document whether used or not.

(2) **Influencing Grades.** Academic council may dismiss any student for approaching directly or indirectly in any form to influence a teacher for grades.

(3) **Other Indiscipline Behavior.** Academic council may dismiss any student on disciplinary ground if any form of indiscipline or unruly behavior is observed in him/ her which may disrupt the academic environment or program or is considered detrimental to BUP's image. Academic Committee will process the matter.

11. **Academic fees***

Items of Academic fees shall be reviewed and recommended from time to time by the Academic Council of BUP and approved by syndicate meeting of BUP.

11.1 Tuition and other Fees

All civil students and military students (where applicable) will be required to pay tuition and other fees as under:

11.2 Payment Schedule

Ser	Category of fees/charges	Thesis	Project	Remarks
1.	Admission Fee	5,000.00	5,000.00	once
2	Semester Registration Fee	500.00	500.00	once
3	Course Registration Fee (500/ Cr)	12,000.00	24,000.00	As Per Cr Reg
4	Internship / Project (2300/ Credit)	27,600.00	27,600.00	As Per Cr Reg
5	Library Fee (200 /Sem)	800.00	800.00	Each semester
6	Computer Lab and Training Aid Fee (500/Sem)	2,000.00	2,000.00	Each semester
7	Security Money	10,000.00	10,000.00	Once(Refundable)
9	Tuition Fee (2000 / Credit)	72,000.00	72,000.00	Each semester
10	Exam Fee/ Course Registration Fee (1000/ Theory Credit)	18,000.00	18,000.00	Per subject
11	Grade Sheet Fee (500/ Sem)	2,000.00	2,000.00	Each semester
12	Student Welfare Fee (1000/ Sem)	4,000.00	4,000.00	Each semester
13	Education Enhancement Fee			Each semester
14	Cultural/ Magazine Fee (150/ Sem)	600.00	600.00	Each semester
15	Dissertation Fee (250 per credit)	4,500.00	4,500.00	
16	Center Fee (1000/ Sem)	4,000.00	4,000.00	Each semester
17	ID Card Fee	100.00	100.00	once
18	Tie/Scarf	630.00	630.00	
Grand Total		1,63,730.00	1,75,730.00	

11.2 Additional Fees/Payments (As Required)

Ser	Subjects	Amount (Tk.)
1.	Re-admission	3500.00
2.	Migration	500.00
3.	Non Collegiate (per subject)	3000.00
4.	Provisional / Original Certificate Fee	375.00
5.	Late Registration Fee	1000.00
6.	Convocation	3000.00
7.	Special Final Exam Fee	4000.00

11.3 Notes:

During the 1st semester of study Tk. 10,000.00 will be kept as security money and the same will not be refunded until completion of last semester. There will be no forfeiture of security money if a student opts to withdraw before the closing of admission activities allowing another candidate to avail the seat. But the 25% of the security money will be forfeited if a student opts to withdraw within 1st year of study after admission activities and the rest will be refunded on completion of 1st year. However, for withdrawal after 1st year of study, there will be no forfeiture of security money. But all other fees/charges (case to case basis) may be refunded to the student, and in such case the security money will be converted into caution money and the same may be refunded excluding any claim from BUP if any.

***All fees mentioned in the table will be reviewed as and when necessary by the university authority and the students are required to pay the fees as changed/reviewed fees.**

11.4 Deadline for Submission of Fees/Dues

The 1st Semester students will have to clear all the fees during the admission process after publication of result. For subsequent semesters, the payment of all fees/dues must be maintained semester wise and the following rules will apply in this regard:

11.3.1 The semester fees can be paid before 7 days of starting each semester without any penalty or prescribed date by the FST.

11.3.2 If a student fails to pay the semester fees within given time, his/her name will be dropped and the student will have to apply for re-admission, should he/she desires to continue his/her study. If approved, he/she may take re-admission paying re-admission fee.

11.3.3 All fees mentioned in the table will be reviewed as and when necessary by the university authority and the students are required to pay the fees as changed/reviewed fees.

11.5 Fine. A fine of TK 500/- per 15 days will have to be paid for late deposition of fees up to a maximum period of next one month. If a student fails to clear dues within next one month of the stipulated time mentioned above, his/her name will be dropped. The student has to apply to Dean, FST for re-admission with necessary penalties and fees should he/she desires to continue, within a maximum period of next 15 days.

11.6 Refund of Fees

All fees are non-refundable. Only Security money is refundable as per policy written 11.3 in this book.

16. Dress Code

The way a student dress up in the classroom determines how people perceive him or her as a professional/executive. It is assumed that the students understand about the professional attire. However, the authority has the right to implement some kind of dress code for its students as

classroom attire. It is preferred that its students will wear appropriate executive dress during classroom/ academic activities. The dress code for students, which will be effective from January 2015, is given below:

- **Male**
 - **Summer**
 - Sober colored half sleeves shirt (for summer)
 - Sober colored trouser/pant
 - Collared button-down full sleeved shirt duly tucked in
 - Appropriate leather belt
 - Appropriate leather shoes
 - Formal Suit/blazer/sports coat (optional during summer)
 - **Winter**
 - Sober colored trouser/pant
 - Collared button-down full sleeved shirt duly tucked in
 - Formal Suit/blazers/Sports coat (preferred)
 - Sober colored Jacket/Sweaters
 - Appropriate leather belt
 - Appropriate Tie (optional)
 - Appropriate leather shoes
- **Female**
 - **Summer**
 - Sober colored salwar and kamiz or trouser/pant and kamiz with appropriate scarf (orna)
 - Appropriate shoes/Dress Sandals
 - Women suit/blazer with collared shirt (optional)
 - **Winter**
 - Sober colored salwar and kamiz or trouser/pant and kamiz with appropriate scarf (orna)
 - Women suit/blazer with collared shirt (preferred)
 - Sober colored Jacket/Sweater/Cardigan
 - Appropriate shoes/Dress Sandals
- **Accessories and Jewelry**
 - Accessories should be tasteful, professional
 - Jewelry should be worn in good taste

- **Makeup, Perfume/Cologne**

- A professional appearance is encouraged and excessive makeup is unprofessional. Someone may be allergic to the chemicals in perfumes and makeup, so one should wear these substances with restraint.

- **ID Card**

Students must hang their ID card as part of the dress code in a manner so that it is visible while they are in the campus

- **Do not wear**

- T-shirt, frayed or faded shirts
- Sleeveless kamiz/blouses, tops, sweatshirt, sweatpants
- Leggings, stretch pants, cargo style pants, pants that are frayed, holes or are faded, all kind of skirts
- Denim/Jeans (pants or shirts), leather trousers/pants
- Birkenstock type sandals or flip flops/slippers, athletic or hiking shoes
- Shorts or three-quarters
- Any kind of indecent clothing

Disclaimer: The university authority reserves the right to cancel/ modify/ change any information given in this prospectus.

Chapter - III

Courses in Information and Communication Technology Program

3.1 Semester-wise Credit Hour Distribution

Total maximum credit hour for MICT Program is 60 Credit Hours. Semester-wise distribution of credit hours for a full time student is shown below:

Semester	Credit Hours
First	12
Second	12
Third	18
Forth	18
Total	60

3.1 Syllabus and Credit Hours

3.1.1 For M.Sc in ICT or MICT, completing a minimum of 8-10 courses (3 compulsory core, 3 elective core and 2-4 elective) is compulsory for the successful completion of the MICT Program. An elective is offered, subject to the availability of faculty and minimum number of students signing up for a course. However, the Academic committee on the basis of faculty availability and number of applicants decides the offering of an elective core and elective course in a semester. The students have to complete 16 courses (those who are not from Engineering discipline).

3.1.2 The details of compulsory core (A), elective core (B), elective (C), courses for Non- Engineers (D) is appended below:

A. Compulsory Core Courses: [09 Credits]

1. MICT-1101 -Advanced Multimedia Communication
3. MICT-2101 -Advanced Database Management Systems
4. MICT-1102 -Advanced Data Communication

B. Elective Core Courses: [09 Credits]

1. MICT-1103 -Digital Forensics
10. MICT-2212 -Advanced Telecommunication Systems
8. MICT- 2209-IT Entrepreneurship and Innovation

- 3. MICT- 1203 -Cloud Computing
- 2. MICT -1201 -ICT Project Management
- 5. MICT-2107 -Network Planning and Management
- 4. MICT- 2202-Advanced Artificial Intelligence
- 7. MICT-2204 -Computer Graphics and Animation
- 11. MICT- 2213-Advanced Embedded Systems
- 9. MICT-2210 -Wireless Communication
- 4. MICT-1204 -Advanced Digital Communication

C. Elective Courses:[12 Credits] for Project Group

- 2. MICT-2102 -Advanced Web Programming
- 4 . MICT- 1202-Cyber law and Ethics
- 2. MICT- 2208-Ethical Hacking
- MICT-2201-OS and Network Security
- MICT-2205-Big Data Analytics
- MICT- 2104-Advanced Pervasive Computing
- MICT-2211-Advanced Optical Communication
- MICT-2108 -Spectrum Policies and Management
- MICT-2106 -Mobile/ Cellular Communication
- MICT-2206 -Data Warehousing and Mining
- MICT- 2103-Advanced Computer Network
- MICT-2203 -Mobile Apps Development
- MICT- 2207-Recent Development in ICT

D. Courses for Non- Engineering Background*: [09 + 09 Credits]

- MICT-1104-ICT Fundamentals
- MICT-1206-Computer Programming
- MICT-1204-Data Structure and Algorithm

MICT-1205-Mathematics for Engineers

MICT-1207-Operating System

MICT-1208-Database Management

MICT-1209-Networking

* Subjects relevant to ICT may be decided as equivalent based on the recommendation of the Equivalence Committee.

3.2.3 The semester-wise likely distribution of courses for the Master of Information and Communication Technology (MICT) is shown below:

Year	Semester	SL	Course Code	Course Name	Credit Hour	Total Contact Hour
1 st	1 st	1	MICT -1101	Advanced Multimedia Communication	3.00	48.00
		2	MICT -1102	Advanced Data Communication	3.00	48.00
		3	MICT -1103	Digital Forensics	3.00	48.00
		4	MICT-1104	ICT Fundamentals	3.00	48.00
				Total	12.00	
	2 nd	1	MICT-1201	ICT Project Management	3.00	48.00
		2	MICT-1203	Cloud Computing	3.00	48.00
		3	MICT-1204	Data Structure and Algorithm	3.00	48.00
		4	MICT-1205	Mathematics for Engineers	3.00	48.00
				Total	12.00	
2 nd	1 st	1	MICT-2101	Advanced Database Management System	3.00	48.00
		2	Code of Related Subject	Option I-Information Technology Related Subjects(Elective Core)	3.00	48.00
		3	Code of Related Subject	Optional II- Communication Related Subjects(Elective)	3.00	48.00
		4	Code of Related Subject	Optional III -Management Related Subjects	3.00	48.00
		5	MICT -2000	Project/	6.00	48.00

2 nd	2 nd		Total	18.00	48.00	
		1	Code of Related Subject	Option I-Information Technology Related Subjects(Elective Core)	3.00	48.00
		2	Code of Related Subject	Option I-Information Technology Related Subjects(Elective Core)	3.00	48.00
		3	Code of Related Subject	Optional II- Communication Related Subjects(Elective)	3.00	48.00
		4	Code of Related Subject	Optional II- Communication Related Subjects(Elective)	3.00	48.00
		5	MICT – 2000	Project	6.00	48.00
				Total	18.00	48.00
				Option I-Information Technology Related Courses		
		1	MICT -1201	ICT Project Management	3.00	48.00
		2	MICT -1202	Cyber Law and Ethics	3.00	48.00
		3	MICT -1203	Cloud Computing	3.00	48.00
		4	MICT -1204	Advanced Digital Communications	3.00	48.00
		5	MICT -2102	Advanced Web Programming	3.00	48.00
		6	MICT -2202	Advanced Artificial Intelligence	3.00	48.00
		7	MICT -2103	Advanced Computer Network	3.00	48.00
		8	MICT -2208	Ethical Hacking	3.00	48.00
		9	MICT- 2205	Big Data Analysis	3.00	48.00
		10	MICT- 2104	Advanced Pervasive Computing	3.00	48.00
		11	MICT- 2206	Data Warehouse and Mining	3.00	48.00
		12	MICT- 2203	Mobile Apps Development	3.00	48.00
		13	MICT- 2207	Recent Development in ICT	3.00	48.00
14	MICT- 2204	Computer Graphics and Animations	3.00	48.00		
15	MICT -2209	IT Entrepreneurship and Innovation	3.00	48.00		
16	MICT -2201	OS and Network Security	3.00	48.00		
		Option II- Communication Related Courses				
17	MICT -2212	Advanced Telecommunication System	3.00	48.00		
18	MICT -2213	Advanced Embedded Systems	3.00	48.00		
19	MICT -2211	Advanced Optical Communication	3.00	48.00		
20	MICT -2210	Wireless Communications	3.00	48.00		
21	MICT -2106	Mobile/Cellular Communication	3.00	48.00		

				Option III -Management Related Courses		48.00
		22	MICT -2107	Network Planning and Management	3.00	48.00
		23	MICT -2108	Spectrum Policies and Managements	3.00	48.00
				Option IV – ICT Fundamentals Related Courses		
		24	MICT-1206	Computer Programming	3.00	48.00
		25	MICT-1205	Mathematics for Engineers	3.00	48.00
		26	MICT-1207	Operating System	3.00	48.00
		27	MICT-1208	Database Management	3.00	48.00
		28	MICT-1204	Data Structure and Algorithm	3.00	48.00
		29	MICT-1209	Computer Networking	3.00	48.00

3.2.3 The semester-wise likely distribution of courses for the Master of Science in Information and Communication Technology MSc.(ICT) is shown below:

Year	Semester	SL	Course Code	Course Name	Credit Hour	Total Contact Hour
1 st	1 st	1	MICT -1101	Advanced Multimedia Communication	3.00	48.00
		2	MICT -1102	Advanced Data Communication	3.00	48.00
		3	MICT -1103	Digital Forensics	3.00	48.00
				Total	9.00	
	2 nd	1	MICT -1201	ICT Project Management	3.00	48.00
		2	MICT-1203	Cloud Computing	3.00	48.00
			Total	6.00		
		1	MICT-2101	Advanced Database Management System	3.00	48.00

2 nd	1 st	2	Code of Related Subject	Optional I- Information Technology related courses	3.00	48.00	
		3	MICT - 2000/2100	Project/Internship	6.00/6.00	48.00	
				Total	12.00		
	2 nd						
		1	Code of Related Subject	Optional II- Communication Related Subjects(Elective)	3.00	48.00	
		2	Code of Related Subject	Optional I- Information Technology related courses	3.00	48.00	
		3	MICT – 2000/2100	Project/Internship	6.00/6.00	48.00	
				Total	12.00		
				Option I-Information Technology Related Courses			
		1	MICT -1201	ICT Project Management	3.00	48.00	
		2	MICT -1202	Cyber Law and Ethics	3.00	48.00	
		3	MICT -1203	Cloud Computing	3.00	48.00	
		4	MICT -2102	Advanced Web Programming	3.00	48.00	
		5	MICT -2202	Advanced Artificial Intelligence	3.00	48.00	
		6	MICT -2103	Advanced Computer Network	3.00	48.00	
		7	MICT -2208	Ethical Hacking	3.00	48.00	
		8	MICT- 2205	Big Data Analysis	3.00	48.00	
		9	MICT- 2104	Advanced Pervasive Computing	3.00	48.00	
		10	MICT- 2206	Data Warehouse and Mining	3.00	48.00	
		11	MICT- 2203	Mobile Apps Development	3.00	48.00	
	12	MICT- 2207	Recent Development in ICT	3.00	48.00		
	13	MICT- 2204	Computer Graphics and Animations	3.00	48.00		
	14	MICT -2209	IT Entrepreneurship and Innovation	3.00	48.00		
	15	MICT -2201	OS and Network Security	3.00	48.00		
			Option II- Communication Related Courses				
	16	MICT -2212	Advanced Telecommunication System	3.00	48.00		
	17	MICT -2213	Advanced Embedded Systems	3.00	48.00		
	18	MICT -2109	Advanced Digital Communications	3.00	48.00		
	19	MICT -2211	Advanced Optical Communication	3.00	48.00		
	20	MICT -2210	Wireless Communications	3.00	48.00		

		21	MICT -2106	Mobile/Cellular Communication	3.00	48.00
				Option III -Management Related Courses		48.00
		22	MICT -2107	Network Planning and Management	3.00	48.00
		23	MICT -2108	Spectrum Policies and Managements	3.00	48.00
				Option IV – ICT Fundamentals Related Courses		
		24	MICT-1206	Computer Programming	3.00	48.00
		25	MICT-1205	Mathematics for Engineers	3.00	48.00
		26	MICT-1207	Operating System	3.00	48.00
		27	MICT-1208	Database Management	3.00	48.00
		28	MICT-1204	Data Structure and Algorithm	3.00	48.00
		29	MICT-1209	Computer Networking	3.00	48.00

3.3. Pre-requisite for Students other than Engineering Background

The students not having engineering background can undergo the MICT provided they complete 18 credit pre-requisite courses. The students' needs to undergo examination if not made equivalence through the departmental academic committee.

3.4 Course Curriculum of MICT:

A. Compulsory Core Courses:

A1. MICT1101- Advanced Multimedia Communication

Overview to Multimedia Systems, Multimedia storage, Data compression techniques for audio and video, Synchronization, Multimedia networking and protocols, QOS principles, Video streams on ATM, Mobile multimedia communications, Operating system support for multimedia, Hypermedia system, Standards for multimedia, Multimedia database and Multimedia Applications.

A2. MICT2101- Advanced Database Management Systems

Object Oriented Database; Data Model, Design, Languages; Object Relational Database: Complex data types, Querying with complex data types, Design; Distributed Database: Levels of distribution transparency, Translation of global queries to fragment queries, Optimization of access strategies, Management of distributed transactions, Concurrency control, Reliability, Administration; Parallel Database: Different types of parallelism, Design of parallel database; Multimedia Database Systems Basic concepts, Design, Optimization of access strategies,

Management of Multimedia Database Systems, Reliability; Database Wire-housing/Data mining: Basic Concepts and algorithms.

A3. MICT-1102 - Advanced Data Communications

Concept of Protocols, Layered Protocol Architectures, OSI Model and TCP/IP protocol suite , Data transmission, Data encoding, Digital data communication techniques, Data link control, HDLC, Multiplexing, Transmission media, ISDN and broadband ISDN, PPP, Troubleshooting, Circuit switching, Packet switching, Frame Relay, Asynchronous Transfer Mode (ATM), Congestion control and quality of service. Frame relay architecture, Standards and protocols, Switched Multi Megabit Data Services, ATM standards protocols, ATM LANs, Optical Communication and SONET/SDH, Broadband access technologies, x-DSL. B-ISDN protocol and architecture, Broadband service aspects and access architecture, Broadband transmission networks, Broadband intelligent network, high-speed switching architectures, network management and control, and modeling and analysis of high-speed networks.

B. Elective Core Courses:

B1. MICT - 1103- Digital Forensics

Digital Forensics: An overview, Forensics basic and criminalities, Basics of Operating system and networking: A review, Forensic modeling and principles, Forensic duplication and analytics, File carving and testing, Cyber forensics tools and testing, processing crime and incident scenes, mobile device forensics, network surveillance and accountability, network attach trace back and attribution, multicast finger printing, multimedia forensics, Intrusion and online frauds detection, Steganography; Cyber law, Security and Privacy policies; Court testimony and report writing skills; Digital Evidence control.

B2.MICT - 2212 - Advanced Telecommunication Systems

Challenges in modern communications technology, baseband and broadband signal transmission, first and second Nyquists criteria for zero intersymbol interference; robust signal compression and detection techniques, optimum receivers, design of frequency- and time-domain equalizers and echo cancellers; wired and wireless channel characteristics, AWGN channels, time-varying multipath faded channels, channel modeling; advanced source and channel coding techniques, high bit rate digital modulation schemes and MODEMS; SS7 and HDLC protocols, H.323, H.26x, RTP and SCTP; modern high speed communication networks and emerging technologies, access and backbone networks, intelligent networks, NGN; advanced switching and routing principles, VoIP, IP TV, HDTV

B3. MICT -2103 - IT Entrepreneurship and Innovation

The purpose of this course is to introduce a range of foundational concepts in understanding the knowledge economy. It covers fundamental issues such as the organization of innovation and R&D within the firm, managing creative people, how and why firms collaborate with other firms in networks and strategies to protect their own position. The role of standards and the impact of disruptive technologies. Besides it also includes real experience of the processes and activities involved in setting up and developing a new venture. The course covers topics relating to business planning, finance and implementation, such as Strategic Analysis and Development, Business Plans and Planning, Entrepreneurial Finance and Financial Statements, Funding and resourcing a developing business, Business models Scenario development and evaluation.

B4. MICT -2107-Advanced Artificial Intelligence

Introduction; Advanced search techniques in AI, knowledge based system design, advanced plan generating systems; Probabilistic Reasoning, decision networks; Making complex decisions: Sequential decision problems, partially observable Markov decision problems (POMDPs); Multiple agent theory: Cooperation among multiple agents; Learning from observations: Inductive learning, decision trees, ensemble learning; Knowledge in learning: Use of logic, explanation based learning, inductive logic programming; Statistical learning: Complete data, hidden nodes (EM method), instance based learning, neural networks and neural belief networks; Fuzzy logic and genetic algorithm.

Overview of artificial neural networks; Neuro-Models; Simple neural networks; Multilayer neural networks: Multilayer Perceptrons (MLP), logistic activation function, backpropagation algorithm; Neural network applications; Overview of fuzzy system; Crisp sets to fuzzy sets; Operations on fuzzy sets, fuzzy arithmetic, fuzzy relations; Applications.

B5.MICT- 2105 -Computer Graphics and Animation

Advanced Graphic Techniques: Graphics basics, Three dimensional drawings, Geometric forms and models, Hidden surfaces, Fractals; Advanced rendering Techniques: Shadow generation techniques, Texture and environment mapping techniques, Procedural texture mapping and modeling, Ray tracing, Radiosity methods, Global illumination models, Volume rendering techniques; Advanced Animation: Animation articulated structures, Soft object animation, Procedural animation.

B6.MICT -2202-Advanced Embedded Systems

Introduction to systems engineering; Embedded system design; Arduino introduction and basic

circuit diagrams; Instruction sets, registers and memory access; digital I/O, LEDs and buttons; Timers, debugging timers and I/O debugging; Pulse width modulation (PWM) servos; PWM; Analog to digital converters (A2D); Analog sensors; CPU bus, communication protocols (UART, SPI, RS485); Interrupts, communication; I2C, peripherals, sensors; Embedded Operating Systems; Embedded systems application; Power management, Embedded algorithms, program optimization.

Prerequisite: Digital Electronics, Electric Circuits

B7.MICT- 2106 - Cryptography

Introduction to cryptosystems, crypto analysis, Data encryption standard and DES, Public Key Cryptography - RSA cryptosystems, factoring algorithms, other public key cryptosystems: ElGamal cryptosystem and discrete logs, Merkle-Hellman Knapsak system, Signature scheme: Digital Signature Standard, Hash functions and signature, Birthday attack, Key distribution and digital certificate, Kerberos, Diffie-Hellman key exchange. Identification schemes and authentication codes, deception probabilities, combinatorial and entropy bounds, secret sharing schemes, Access structure and general secret sharing, indistinguishable probability, distribution, probabilistic encryption, zero knowledge proofs.

Origins, computer arithmetic and complexity- what is cryptography, a history of factoring and primality testing, computer arithmetic and complexity, Symmetric-key cryptosystems- an introduction to congruences, block ciphers, DES cryptanalysis, successor AES, stream ciphers, Public-key crypto-systems- exponentiation, discrete logs, public key cryptography, authentication, knapsacks, Primality Testing- an introduction to primitive roots, true primality tests, probabilistic primality tests, Agrawal algorithm,

Factoring- three algorithms, the number field sieve, Advanced topics – elliptic curves and cryptography, zero knowledge, quantum cryptography

B8. MICT- 2102 -Wireless Communication

Characteristics of cellular communications; QOS in cellular communications; Wireless LAN; Wireless ATM and media access protocols for WATM; Wireless application protocols; Wireless personal communications; Mobile IP; Spread spectrum techniques: DSSS, FHSS, CDMA2000, WCDMA, GSM, CPDP; satellite communications – internetworking via satellites; Mobile satellite communications. 3G and 3GPP mobile communications and WiMAX technology, broadband wireless communication

Aspects of radio wave propagation for fixed and mobile communication systems, and cellular system design. Large-scale and small-scale propagation models, multipath fading, link-budget, interference and frequency reuse, multiple access schemes and system capacity. Trunking and grade of service, wireless network planning and operation. Architecture and operation of 2G cellular mobile systems, 2.5 G, 3G and higher technologies. Special techniques/Diversity,

Equalization, Interleaving, and Smart Antenna.

B9. MICT - 2109 -Advanced Digital Communications

Characteristics of different types of channels, storage channels; Digital modulation schemes, Digital transmission: Mapping, impulse shaping, receiver design, inter-symbol interference, eye diagram, noise, symbol error probability for multilevel transmission, partial response technique; Equivalent baseband channel; Equalizer, adaptive equalizer; System design with joint Nyquist and matched filter condition; Orthogonal signals, correlation receiver and equivalent matched filter receiver; Optimum detection: Bayes, Maximum Likelihood (ML) and Maximum A Posteriori Probability (MAP) detection, ML symbol by symbol and sequence detection, soft and hard decision, Viterbi algorithm, Viterbiequalizer; Soft input decoding of convolutional codes; Principles of Code Division Multiplex and Access (CDMA), near-far problem, multi-user interference, synchronous orthogonal receiver; Time varying multipath channels for mobile communication, time and Doppler-variant transfer function, statistical channel description, scattering function, AWGN channel with Rayleigh-fading, error probability; Principles of Turbo Coding

B10. MICT- 2104-Cloud Computing

Introduction of several novel security challenges. The co-residency of machines: virtual machines, database engines, hardware resources, storage resources. Cloud Security vulnerabilities: infrastructure level, primary level, user level. Operating system in cloud computing. Security breaches: unauthorized connections, unauthorized leakage of information, unmonitored login attempts, malware propagation. Internal cloud infrastructure. Mount cross-VM side-channel attacks. Security controls for the protection of tenant resources, security concerns of un-authorized disclosure, segregation of tenants, isolation of compute, storage and network resources, Firewalls and License issue.

B11.MICT-1203-ICT Project Management

The course is a practitioner's approach to ICT project management and quality assurance. It provides information on how project management and the effective use of software can help manage ICT projects. Topic includes Project integration management; Project scope management; Project time management; Project cost management; Project quality management; Project human resource management; Project communications management; Project risk management and Project procurement management.

B12.MICT -2107-Network Planning and Management

The primary objective of this course is to give students an understanding of how to

design, manage and secure a computer network. Topic includes: Network design and implementation(Network set up,Router & switch set up, A small network design, A small WAN design example, A simple design algorithm); Network operations and management (Configuration Management); Network Monitoring and reporting (Installing MRTG, Configuring MRTG, Performance Management,A case study using MRTG, Fault Management,Troubleshooting); Traffic analysis and Security.

C. Elective Courses :

C1.MICT - 2108 - Advanced Web Programming.

Object-oriented concepts/techniques in Web programming, Three-tier architecture in Web programming Session management, Writing secure code-JavaScript, jQuery,AJAX, Advanced CSS concepts and techniques, Advanced database interactions, Data validation techniques, Authentication and security in Web pages Creating rich interactive web applications.

C2.MICT -1202 -Cyber law and Ethics

Introduction to ethical theories and principles, Ethics and critical reasoning in computer science, Privacy, personal information, and trust, Software piracy, Music and video piracy, Misuse of software, Viruses and hacking, Computer communication and freedom of expression, Security and encryption, Content control and censorship, Computer crime, Professional issues and decision-making, Intellectual property and licensing, ACM Code of Ethics and Professional Conduct Software Engineering, Code of Ethics and Professional Practice as recommended by the ACM/IEEE-CS Joint Task Force. Law: National ICT Act, National ICT Policy, National e-services rules, National Information security policy guideline, National Copyright, patent, trademark related laws, Laws on document & records retention, UN conventions/Laws related to internet or cyber security, Rights to know, Freedom of Information. Case Study: Methods for case analysis, Analysis of Cases, Minutes of Annual Meetings of ITU, UN on ICT policy, Report/Presentation.

C4.MICT - 2208- Ethical Hacking

Trojans and backdoors: Introduction, Overt and covert channels, Security risks, OS file systems

roles; Virus and worms: Introduction, Characteristics, Countermeasures; Sniffers: Introduction, Lawful intercept, Using tools, hardware protocols, Detect sniffing; Social Engineering: Introduction, Types of social engineering, Treats, Defenses, Countermeasures; Phishing: Introduction, Overview, Attacks, Countermeasures; Denial of Service: Introduction, Attacks, Preventing DoS/ DDoS; Buffer Overflow: Introduction, Testing vulnerability, Attacks, Countermeasures.

C5.MICT -1204 - OS and Network Security

Network Security: Introduction to network security, security models, basic type of attacks, authentications, mutual authentications and authentication protocols, Mediated Authentication (with KDC), Kerberos, public key infrastructure (PKI), secured RTP. Physical network security, LAN security, resilient network topologies, VPN security, IPsec, Secure Socket Layer (SSL) and Transport Layer Security (TLS), electronic mail security, firewalls and web security, DNS security, anomaly detection and traffic analysis, intrusion detection algorithms.
OS security: Vulnerabilities, threats, exploits and defense mechanisms in operating systems, logging, auditing, address space randomization, memory protection, virtual machine introspection, malware and malware immunization, use of best practice to configure operating systems to industry security standards, distributed OS security

C6. MICT -2204-Big Data Analytics

Introduction to Big Data Analytics ,Big Data Platforms, Big Data Storage and Processing,Big Data Analytics Algorithms ,Spark and Data Analytics, Linked Big Data ,Big Data Applications (TBA), Data models ,Management issues, Hadoop and Weka, Change management ,Knowledge representation ,Finding business value ,Ethical issues in Big Data ,Data bases and Big Data Dealing with unstructured data ,Data quality management.

C7. MICT- 2205-Advanced Pervasive Computing

Introduction to ubiquitous computing; Security in Mobile Agents; Security in Wireless Sensor Networks (WSN): key management, Secure routing, Attacks and Countermeasures; Trust and Reputation Models: Trust-Based Web Service Provision, Trust Based Security, Reputation Systems, Authentication: Multi-factor Authentication, Persistent/Continuous Authentication, Security in Pervasive Computing: Concepts, basis and trends, Identity and access control, Languages for Identity and access control, Risk Assessment for Better Identity Management in Pervasive Computing, Security of Multi-Application Smart Cards, Context-Aware Security, Biometric security for Pervasive systems; Privacy: Incorporating privacy and security into the design and development process of pervasive applications, Privacy and security for smart homes, smart cars, healthcare, urban computing, smart phones, wearable computers, RFIDs.

C8.MICT -2110 - Advanced Optical Communication

Introduction to optical communication, optical fiber waveguides, classification of fibers, modes of light propagation, attenuation, propagation velocities, modal dispersion, chromatic dispersion, polarization mode dispersion and their compensation schemes; data rate, bandwidth, rise time budget and power budget, modulation and multiplexing, Optical sources: light emitting diodes, semiconductor laser diodes, Optical detector: p-n and p-i-n photodiodes, avalanche photodiodes, Fiber optic components: splicer, connector, coupler, wavelength MUX and de-MUX, optical add drop MUX, Optical amplifier: optoelectronic amplifiers, fiber amplifiers, Raman and Brillouin amplifiers, optical modulation and detection schemes, direct and coherent detection receivers, Fiber nonlinearities: Kerr effect- SPM, XPM and FWM; scattering effects- SRS and SBS, nonlinear Schrödinger equation (NLSE) and its analytical solution with various boundary conditions, optical multiplexing schemes: WDM, OFDM, OTDM and OCDA; optical network.

C9. MICT -2206-Spectrum Policies and Management

Introduction to Spectrum Management, Making Spectrum Policy, Legal Foundations, Making Spectrum Changes, Radio Propagation Fundamentals & Planning Considerations, Spectrum Engineering, Assignment and Allotment, Spectrum Dependent Technologies, Spectrum Economics, From Policies and Procedures, Spectrum Management, Spectrum Monitoring and Enforcement, Introduction to White Space, Dynamic Spectrum Access, The Future of Spectrum Regulation, Overview of WRC 2015 Agenda Items

C10. MICT -2106- Mobile/ Cellular Communication

Introduction and History of Wireless Systems, Cellular Systems, Wireless LANs, Satellite Systems, Paging Systems; Radio Propagation: free space propagation, propagation mechanisms, link budget design using path loss model, outdoor propagation models, indoor propagation models; Introduction to small-scale fading, impulse response model of multipath fading, parameters of multipath channel, type of small scale fading, Rayleigh and Ricean Distribution; Media Access Control: FDMA, TDMA, and CDMA, Aloha, CSMA, MACA; GSM overview: Standards, services and structure, GSM air interface physical layer: physical channels, logical channels, frame structures, modulation, coding and interleaving, GSM signaling: Data link layer, radio resource management, mobility management, Handover, location update and roaming in GSM; Short message service (SMS), circuit switched data, General Packet Radio Service (GPRS), Enhanced GPRS (EGPRS); CDMA Digital Cellular System (IS-95): Forward CDMA Channel, Reverse CDMA Channel; Satellite mobile communications: History, Localization, Handover, Routing; Broadcast System: Unidirectional distribution systems, DAB architecture, DVB-container; WCDMA in 3rd generation system, Difference between WCDMA and 2G air interface, 3rd generation standards.

C11.MICT - 2207 - Data Warehousing and Mining

Basic concept of data mining, issues and techniques. Data warehouse and OLTP technologies for data mining, Classification of data mining techniques and models, data pre-processing, data mining primitives, query languages and system architecture, characterization and comparison. Mining association rules in large database. Cluster analysis, multidimensional analysis and descriptive mining of complex data object. Data mining in distributed heterogeneous database systems. Data mining applications and future research issues

C.12.MICT- 2103 - Advanced Computer Networks

Fundamental concepts in the design, implementation of computer communication networks and their protocols. Topics include: layered network architectures, applications, transport and routing, IP version 6, mobile IP, multicasting, session initiation protocol, quality of service, network security, network management, and TCP/IP in wireless networks. An emphasis will be placed on the protocols used in the Internet.

C.14. MICT -2209 -Recent Developments in Information Communication Technology (ICT)

D. Courses -Pre-requisite for Non- Engineering Background*: [09 + 09 Credits]

D1. MICT-1101-ICT Fundamentals

ICT basics and C Language, The Part of a Computer System, The Information Processing Cycle, Essential Computer Hardware, Software, Device for the hand, I/O Device.

Operating System: its role in computer systems; Operating system concepts; Operating system structure. Basic concepts: Communication systems, Synchronous and asynchronous communications, Hardware interfaces, multiplexers, concentrators and buffers.

Emerging technologies: Bluetooth, Radio Frequency Identification (RFID), Wireless Broadband (WiMAX), Mobile IP, Voice Over Internet Protocol (VOIP), Session Initiation Protocol (SIP).

Mobile communication: GSM Architecture, CDMA Architecture. The generations of mobile communications (2G, 3G, 4G).C language identifier names, Variable, Type Quality, Storage Class Specification, Variable Initialization, Constants, Operators Single Character Input, Single Character Output, Entering Input Data, Writing Output Data, The Gets and Puts Function, Single Dimension Array, Generating a Pointer to an Array, Passing Single-Dimension Array to Function ,String, Two-

Dimensional Array, Pointer Variables, The Pointer Operators, Pointer, Array, Function, Introduction to Matlab.

D2. MICT-3102-Computer Programming

Introduction to JVM, JDK, JRE, PATH, CLASSPATH, JDK Commands, Java Integrated Development Environment (IDE), History of Programming languages, Introduction to Java and its evolution; OOP programming concepts, Understanding Java platform, Language Features, enter, compile and run a program, Introduction to Abstract Window Toolkit (AWT), Difference between AWT and Swing; Java Programs: Application vs Applet; Introduction to Java programming environment: Write Java classes, save class files, compile class files, run Java applications, Introduction to program and execute simple algorithms in Java. Data types, Variables, Conditional statements, Methods, Flow of Control, Object, classes, Wrapper classes, Nested classes, strings, modifiers, Garbage collection, Packages and Interfaces; Methods, Events handling, Decisions and Buttons Loops, Constructors, Overloading, Inheritance, Overridden; Arrays, Abstraction, Polymorphism, Annotations; Test Driven Development (TDD): Basic unit testing, JUnit, FindBugs and PMD in NetBeans; Exceptions, Thread, Streams, Files I/O, Applications, Object Serialization, Tokenization; Object-Oriented Design Concepts in UML (Unified Modelling Language), Writing Code with Class Diagram; Swing & SWING MVC (model-view-controller); Cloning, Application Program interface (API), Graphical User Interface (GUI), Rapid Application Development (RAD), Graphics, Java 2D graphics, Draw chart using Java API, Java Maths Package

D3. MICT-3103-Mathematics for Engineers

Discrete Mathematics:

Logic: Propositional logic, Logical equivalence, Predicates & quantifiers, Logical reasoning

Sets: Basics, Set operations, Functions: One-to-one, Onto, Inverse, Composition, Graphs

Integers: Greatest common divisor, Euclidean algorithm, Sequences and Summations

Mathematical Reasoning and Induction: Proof strategies, Mathematical induction, Recursive definitions, Structural induction, Counting: Basic rules, Pigeonhole principle, Permutations and Combinations, Binomial coefficients and Pascal triangle, Sterling numbers,

Matrices: Definition of matrix; Algebra of matrices; multiplication of matrices, transpose of a matrix, inverse of matrix; rank and elementary transformations of matrices; Solution of linear equations; linear dependence and independence of vectors.

Calculus:

Differential Calculus: Function, Limit, continuity and differentiability, successive differentiation of various types of functions, Leibniz's theorem, Rolle's theorem, Mean Value theorem, Indeterminate form, partial differentiation, Euler's theorem, maxima and minima of functions of single variables, curvature, asymptotes.

Integral Calculus: Definition of integrations, integration by the method of substitution, integration by parts, standard integrals, definite integrals, multiple integral and its application, area, volume of solid of revolution, area under a plane curve in Cartesian and polar coordinates, area of the region enclosed by two curves in Cartesian and polar coordinate, arc lengths of curves in Cartesian and polar coordinates.

Fourier analysis: Real and complex form of Fourier series; Finite transform; Fourier Integral; Fourier transforms and their uses in solving boundary value problems of wave equations.

D4. MICT-3104-Operating System

Operating System: Its role in computer systems; Operating system concepts; Operating system structure; Process: process model and implementation, Inter-Process Communication (IPC), classical IPC problems, process scheduling, multiprocessing and time-sharing; Memory management: swapping, paging, segmentation, virtual memory; Input/Output: hardware, software, disk, terminals, clocks; Deadlock: resource allocation and deadlock, deadlock detection, prevention and recovery; File Systems: files, directories, security, protection; Case study of some operating systems.

D5. MICT-3105-Database Management

Introduction to concepts and methods for storing and manipulating data. File retrieval and organization. Database models and designing of database systems, principles of database management systems, Relational database management systems, Query formulation and language, Methods used for the storage, selection and presentation of Data, Database integrity and security, database languages , popular application packages. Structure of SQL , principals behind the design of SQL.

Introduction of database systems; Common database management systems. Models: Entity-Relationship model, Relational model; Relational algebra; Advanced SQL; Some applications using SQL. Integrity constraint; Relational database design; File organization and retrieval, file indexing and hashing; Transaction manager; Concurrency controller; Recovery manager; Security system; Database administration; Introduction to advanced database management systems: distributed database, parallel database, data mining and warehousing, multimedia, object-oriented, object-relational, real-time database.

D6. MICT-3106-Networking

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 Wi-Fi-IEEE 802.11 , WIMAX- IEEE 802.16; 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

MICT-2200-Projects

MICT-2100-Thesis