



LINCOLN

UNIVERSITY COLLEGE

DKU016 (B)



Course Name:

Bachelor of Information Technology (Hons)

Duration: 4 Years (8 Semesters)

Total Credit Hours: 129

WismaLincoln, No. 12-18, Jalan SS 6/12, 47301 Petaling
Jaya, Selangor Darul Ehsan, Malaysia
(Near Kelana Jaya Giant and opposite Paradigm Mall,
Kelana Jaya)

Tel : 603-78063478 Fax : 603-78063479

www.lincoln.edu.my

E-mail : info@lincoln.edu.my

ABOUT LINCOLN UNIVERSITY COLLEGE

Lincoln University College (LUC), Petaling Jaya, established in 2002 as Lincoln College (LC) and upgraded on 16th August 2011. Lincoln University College is one of the premier private institutions of higher education approved by the Ministry of Higher Education and Malaysian Qualifying Agency (MQA). The University College is situated in the cosmopolitan town of Petaling Jaya which is 10 kilometers West of the capital city, Kuala Lumpur.

Lincoln University College is craving to be a distinguished educational institution that provides world class education for the global market and a center of educational excellence that facilitates the unprecedented amassing of knowledge. Aiming to ensure success for all students not only in the exams but also in future life, this university provides quality teaching with dedicated lecturers and exceptional faculties and programmes that are beneficial for future career.

The founders and administrators of Lincoln University College are true academicians who are committed to helping the students to achieve their potential in the education, research and employment world of this exciting new millennium. They bring together almost fifty years of higher education, post-secondary education and language teaching experience. Their backgrounds include teaching, research and professional training. Lincoln University College's focus is student-centered and student-directed. Our philosophy is that everyone has a claim to education in order to better their life, advance their career and reach their desired level of personal success.

Datuk Dr. Hj. Bibi Florinabinti Abdullah, the Pro-Chancellor of Lincoln University College, was First Director and Registrar of Nursing Board Ministry of Health, Malaysia. She has the greatest passion in changing the whole face of the nursing profession. During her involvement with the government sector, she was the driving force behind the transformation of Malaysia as the country that produced between 5 to 10 thousand nurses per year compared to only a few hundred nurses in the previous years. As the country's Chief Nurse, she was instrumental in professionalized Nursing as a profession from the diploma to the degree level. Undoubtedly, her passion in nursing field has been continually transformed to Lincoln University College.

The founder and Vice-Chancellor of Lincoln University College is Dr. Amiya Bhaumik, who is purely from field of education. He is Executive Vice President of the International Education Consulting Group, St Louis, USA since 1999. Dr. Amiya Bhaumik was Research Fellow of UNESCO, Paris during this tenure, Dr. Bhaumik has traveled extensively to Europe, Africa, Asia and Latin America. He has served as professor of Business Administration in University of Lucknow, India and in University of Malaya and many other countries.

Another significant individual who contributes to the success of this University College is Prof. Datuk Dr. Abdul Gani Bin Mohammed Din, who is the Deputy Vice Chancellor (Academic). Previously he was the Deputy Director General, Ministry of Health, Malaysia. He has contributed his entire career to make Malaysia more developed and more competitive country in health management field. As the Head of Academic, Datuk Gani ensures that the courses offered are more practical and holistic. Thus, the knowledge that the students gain from the University College has a great value and can be practiced in the real world.

Lincoln University College is an ideal learning institution to career shifters, second degree students and high school seniors who are considered getting a diploma, under-graduate or post-graduate degree, will open many doors of career opportunities. For those working adults pursuing second careers or acquiring new skills, this University College offers the occupational and professional training they need, to go ahead in today's competitive marketplace.

LINCOLN UNIVERSITY COLLEGE MISSION AND VISION

MISSION

Lincoln University College, is a multilingual, diverse, multicultural institution of higher education that ensures the intellectual, professional advancement, be free (from all types of limitations, all bondages, all littleness), manifestation of latent power of every human being through morality based on strength and synthesis for reverential ethical, social unity, integrity and holistic. Lincoln maintains a proud tradition of research and scholarly activity and prepares its graduates for career opportunities in a highly competitive, technological and rapidly changing world.

VISION

- To be acclaimed institution of higher learning that is able to cater to the global community.
- To be distinguished educational institution that provides world class education for the global market.
- To be center of educational excellence that facilitates the unprecedented amassing of knowledge.

INTRODUCTION TO THE COURSE

This course aims to provide the fundamentals information technology, methodological and implementation issues of IT-related subjects. This course is both highly technical and people-orientated. The course focuses on scientific and technical areas related to software, network, web, database and internet services, along with areas such as management, communications and human behaviour. The student through this course will gain in-depth knowledge and be prepared for jobs in the information technology profession. In addition, graduates will display effective communication skills, independence and creativity, critical judgment and ethical and social understanding.

PROGRAMME OBJECTIVES

The program aims to give knowledge with depth and accuracy of the impact of information technology within an organization, with society at large, and a detailed appreciation of the impact of information technology on the global scale. The students are taught to achieve their academic goals by engaging in scholarly activities related to economic development of the region through partnerships with industry, inventors, and entrepreneurs. The objective is to apply the knowledge to help the society to develop in a positive way.

ENTRY REQUIREMENT

The applicant to the Bachelor of Information Technology (Hons) program must meet the following minimum requirements to be eligible to apply for this program:

- Passed Higher School Certificate Malaysia (STPM) with 2 full pass or equivalent with a CGPA minimum 2.0 and credit in Mathematics at the Certificate Education Malaysia (SPM); or
- Passed the Matriculation program or
- Program Basic recognized with a CGPA 2.0 AND credit in Mathematics at the SPM; or
- Graduate Diploma in Computer Science, Systems Information, Information Technology, Software Engineering or equivalent with a minimum CGPA of 2.5; * Caton with CGPA below 2.5 but above 2.0 may be accepted subject to a rigorous internal assessment process; or
- Other diploma obtained Minimum CGPA of 2.5 and credit in Mathematics at the SPM; or
- Pass the South Australian Matriculation (SAM) / Tertiary Entrance Exam (TEE) / Any other Australian Matriculation with TER minimum 50% or
- Other qualifications recognized by the Government of Malaysia or
- Passed equivalent 10+2 examination with minimum 45% in any discipline.
- Or Pass in A-Level with at least a credit in 2 subjects including Mathematics at SPM level or equivalent;
- Or Pass the Unified Examination Certificate (UEC) with at least a grade B in 5 subjects including Mathematics and English;
- Or Graduate Diploma in Computing or equivalent with a minimum CGPA of 2.5;
- Or candidates who obtained a CGPA below 2.5 but above 2.0 may be accepted subject to rigorous internal assessment process;
- Or Graduate Diploma other than Computing with CGPA minimum 2.5 AND credit in Mathematics ;
- Or Other equivalent qualification recognized by the Government of Malaysia

PROGRAMME FACTS

Programme Name: Bachelor of Information Technology (Hons)

Programme Duration Month: 48 Month

Semester Duration (Months): 6

Intake Months: November

No. of Semester: 8

Level: Bachelor

Field of Study: Science, Mathematics & Computer

Credits: 129.00

ASSESSMENT METHODS AND TYPES

The examination will be conducted and monitored by Lincoln University College, in presence of the representative from Lincoln University College. To successfully complete a subject/ module, the student has to achieve Pass marks in both internal assessments as well as final examination.

Type of Assessment	Components of Assessment	Weightings of Components (%)
Written test	Quizzes	10
	Mid Term	20
	Final Examination	50
Assignment 1		10
Assignment 2		10

GRADING SYSTEM

MARKS	GRADE	Value	Interpretation
100 - 80	A	4.00	Distinction
79 - 75	A-	3.67	Very Good
74 - 70	B	3.33	Satisfactory
69 - 65	B-	3.00	
64 - 60	C	2.67	Pass
59 - 55	C-	2.33	
54 - 50	D	2.00	
49 - 47	D-	1.67	Fail
46 - 44	F	1.33	
43 - 40	F-	1.00	
Below 40	TL, X, MITM, TD, G, or XG	0.00	

INTERPRETATION OF THE GRADING SYSTEM

A	Distinction	Showing outstanding achievement
A-,	Very Good	show honors achievement of a more higher than average achievement of other students of the class
B, B –	Satisfactory or Average	Show satisfactory performance with an average performance
D	Pass	Showing percentage less than the average achievement of all students in the same class
F-, F , D-	FAIL	Failure to demonstrate achievement
X	Barred	Prevented or precluded from taking the course. Removed from the programme.
TL	Incomplete	Students do not complete the task by a module that required; with the permission of the lecturer.
MITM	Unsatisfactory	Assignments given to modules based on "pass / fail" basis
TD	Withdrawal	calculation does not count toward the achievement of a semester
G	Drop out from the course	drop the course grade with the permission of the Faculty Lecturer week 4 to week 10 ahead before the semester ends
XG	Continuing	Given the symbol "XG" is not given a grade point. Not more than one semester is completed. Neither fail nor incomplete. No notice given but still sitting for the next semester.

GRADUATION CERTIFICATE

After successful completion of the course the Lincoln University College will provide the graduation certificate to the students. Only the students who will garner the cumulative grade point average of 2.0 will be eligible for graduation. Students who cannot achieve the benchmarked summative assessment will be given a chance to repeat the specified items.

INFORMATION ON AREA 2: CURRICULUM DESIGN AND DELIVERY

2.1 Academic Autonomy

Benchmarked Standards

2.1.1 Describe the provisions and practices that ensure the autonomy of the department in curriculum design and delivery, and in allocation of resources. Provide supporting documents where appropriate.

The Faculty of Computer Science designs the curriculum with great expertise. The starting up of a new program is discussed at the Programme Committee Meeting first, which is then placed at the Curriculum Committee Meeting. Once approved, the proposed/reviewed programme is forwarded to the Senate or LUC management for final approval. After approval, it is submitted to MQA and MOE for approval.

The process of establishing new curriculum recognizes the various roles of The Faculty of Computer Science the administration and the governing board. The department plays a pivotal role in curriculum review. The Department takes the autonomy to frame & design the new program. It is the department only who consults with the dean of the faculty regarding merits and feasibility of the curriculum proposal for the department. Programme approval, monitoring and review processes at Lincoln University College often involve stakeholders, industrial liaison panels and external examiners. Such involvement may be through consultation about the curriculum and market survey prior to development.

Needs assessment exercises are conducted before the establishment of any programme. Consultations are carried out with employers, staff, students, peers, professionals, industry and informed community members to ensure that the teaching-learning method and delivery process of all programmes are appropriate and current in terms of content; consistent with the attainment of outlined programme outcomes. The Curriculum Committee examines all course proposals to ensure that they contribute to the mission, aims and objectives of the University College.

It's the sole autonomy of the department in deciding over the allocation of resources. In this process a faculty places a requirement with due justification. This is then forwarded to the finance section on due approval from the Dean. The Finance Director approval is followed by quotation placement, purchase order and purchase undertaken by the finance department.

2.1.2 Show the relationship between the departmental board and the senate.

Departmental board closely related with senate regarding academic matter. Department board gives the report to senate about academic progress and developments. Furthermore senate will discuss any issues on the periodical senate session.

2.1.3 How does the department ensure that the academic staffs have sufficient autonomy in areas of his expertise?

The faculty has full autonomy in reviewing curriculum. As the Curriculum Committee shall consists of all the academic staffs in the particular program and is chaired by Dean. The committee function include designing, initiating changes and revision to the course structure, syllabus, text books, assessment methods etc.

The recommendation and decisions from Curriculum Committee will be forwarded to the Senate which coordinates all academic matters across all Senate and non-Senates in the college.

Basically, full time staff shall take responsibility, including lecturers, tutorials, laboratory demo for at least one (1) subject. The assigned workload is between 15-18 hours per week by considering factors such as available teaching resources, subject requirement, and administrative duties of staff and course structure of the program.

The teaching load normally includes classroom teaching and final year project supervision on Dean's also involved with administrative duties time-taking and extra curriculum activities.

In general, the academic staffs have a free hand in the following functions:

- 1) Design the course delivery with reference to the approved syllabus by the college.
- 2) Propose to subjects to teach upon discussion with Dean.
- 3) Prepare the tutorial questions, assignment, examination questions, marking scheme (exam questions will be moderate by internal staff and external examiners)
- 4) Recommended relevant text/reference books for approval.
- 5) Conduct research in own selected research areas in line with college vision and missions.
- 6) Participate in Higher Education Provider Programs or external parties that are relevant to college vision and missions.

Information on Enhanced Standards

2.1.4 State the departmental policies and practices to address conflict of interest, for example, staff involvement in private practice, part-time employment and consultancy services.

Whenever there are issues that involve conflicts of educational principle with regard to the contributions of specific disciplines, this matter can be referred to the Senate that shall then determine the formation of a sub-committee to study these issues together with the relevant representatives of the Programme Committee. The sub-committee members shall comprise of subject matter experts from the relevant disciplines involved.

2.1.5 What are the HEP's plans to expand the autonomy of the academic staff? What is the department's role and how does it support this?

LUC has declared the Faculty of Computer as separate faculty with a hierarchy includes Dean and Deputy Dean, coordinator and lecturer. Each lecturer was given with their own autonomy to perform the regular routine. The decisions on mentees are taken by the lecturer individually with the approval of Deputy Dean or Dean of the faculty.

2.2 Programme Design and Teaching-Learning Methods

Benchmarked Standards

2.2.1 Describe the processes, procedures, and mechanisms for curriculum development. How are the academic and administrative staffs involved in this process?

Before development of any new program, a market survey and need based study program is conducted. Academic and administrative staffs have a big role to decide the procedures, mechanisms, and process for curriculum review, they have responsibility to make each faculty's regulation related with curriculum and Programme, and they will start working to set the regulation by the higher management and curriculum committee of the University College based from the mutual agreement from the meeting. They will work to compile and set the regulation for both parties who are students and lecturers/staff. Before issuing this regulation they have to go to higher management and submit the regulation to them to legalize it.

2.2.2 What are the various teaching and learning methods used in curriculum delivery to achieve the programme learning outcomes? Describe them.

1 Industry (Employers)

Meetings with the various industries.

- (i) Industrial Training/Internship Reports from supervisors about student performance and industry expectations
- (ii) Industrial/Market Feasibility Survey.
- (iii) Graduate Employability Survey/Tracer Study.

2 Professional Bodies/Accreditation Boards (if relevant)

- Professional requirement feedback/audit from the relevant professional bodies/accreditation boards.

3 External Examiners and Visiting Professors

- Feedback about curriculum design/delivery from external examiners and visiting professors.

4 Alumni/Student Representatives

- Meetings with representatives of the student body.

2.3.2 What are the co-curricular activities that enrich student-learning experience, and foster personal development and responsibility?

The Faculty also organises various Co-curriculum activities for the students as part of their complete study such as Workshops, Seminars, Meet-ups, cultural events, traditional gatherings and sports activities regularly.

2.3.3 Curriculum Content and Structure

The department is required to complete following table to highlight the core subject matter essential for the understanding of the concepts, principles and methods that support the programme outcomes, as well as the requirements of the discipline for an award, taking into account the appropriate discipline standards and international best practices for the field.

2.3.4 List the subjects offered in the programme, and include their classification. Arranged by year and semester offered as in the course/module offered in the programme.

The knowledge is measured using written test in examinations and quizzes. Problem solving technique, information management and life-long learning can be measured by conducting the final year project with consideration of ethics and professionalism. Industrial training course refers to experience in the real working environment that is relevant to professional development prior to graduation and an aid to prospective employment. It is an essential element in the development process of professional skills and work ethics required to become an engineer. Communication is achieved through presentation in class exercise as well as presentation of final year project. One of the key ways in which students strengthen their communications skills is through engaging in cooperative learning in small group discussion.

2.2.3 Show evidence that the department have considered market and societal demand for the programme as well as sufficient resources to run it.

There is currently a considerable shortage of professionals in the field of information technology within Malaysia and the neighbouring countries. The production and the demand of the information technology are increasing exponentially and currently makeshift engineers and technicians fill the positions in those activities. For IT industry to flourish, trained professionals are needed so that the industry can grow in a systematic and efficient manner. Moreover, because of the lack of trained professionals in the field of Network technology, many of the local resources that could contribute significantly to the development of the nation remains untapped and/or underutilized costing the nation not only in employment opportunities but also in export potentials. Without these trained professionals, it will be difficult for any nation to make a smooth transition into IT economy and to realize full potential of these opportunities.

2.2.4 Explain how the programme promotes critical enquiry, develop problem solving, decision making, and analytical thinking skills, as well as encourages students to take active responsibility for their learning, and prepares them for lifelong learning.

The development of scientific methods, critical thinking, and problem solving skills will be promoted and imparted through independent studies in scientific research, in tackling the social issues related to energy and environment, in developmental project for technology deployment, in influencing legislative policies, and in building the computer or IT infrastructure. The students will be given opportunity for formulating the issues, formulating solutions through critical thinking, and assessing the results of their own work. Students will be trained to solve problems logically and analytically and to think critically for every decision they make so that their decisions lead to making a positive difference in whatever profession they choose after graduation. LUC makes it compulsory for all students to take part in problem solving and action oriented work. Thus students become more critical and possess analytical mind to make it easier for them to meet the challenges of national as well as global competitive environment.

The curriculum for the Bachelor of Information Technology (Hons) has a mechanism built into it that requires the students to continue learning, to continue gathering new information, and to make use of the information to improve upon the technologies, to broaden the sphere of technology applications, developing novel means of improving the environment, contributing to sustainable economy and improving the quality of life of less fortunate, to make new inventions for the betterment of the society, and to utilize the learning to bring prosperity to the masses. Meritocracy will be guiding principle and a goal that each student must attain through lifelong learning and from making good use of the information. The lifelong learning will also integrate formal, non – formal, and informal education outside of the school environment so as to create ability for continuous lifelong personal development of quality of life. Learning therefore will become an integral part of life which takes place at all times and in all places.

2.2.5 Describe the diverse learning methods and sources, within and outside the classroom, where students acquire knowledge, technical skills, and develop attitudes and behavior in preparation for their learning, individual growth, future work and responsible citizenry (e.g., co-curriculum).

Students are encouraged to join extra-curricular activities such as attending seminars, exhibition, talks and visits to the industry for personal development and improving general knowledge. Various types of student clubs and societies have

been established to encourage student's participation in extra-curricular activities. Officers in charge of such student activities will advise and supervise student's activities as prepared by them.

In addition students will also encourage to join the LUC special project division who will spear National event special project division and to improve their soft skills such as public speaking, leadership and entrepreneurship skills.

Apart from that, students are educated in Critical thinking concept and English Intermediate as part of colloquial activities to understand English as International Languages.

Information on Enhanced Standards

2.3 Show how the programme encourages a multi-disciplinary approach and co-curricular activities in enhancing and enriching the personal development of the learner.

The Bachelor of Information Technology (Hons.) programme is designed to touch every aspect of Information Technology to transit into the industrialization of the computer science. Therefore, this programme by its very definition is meant to encourage multi-disciplinary approach and co-curricular activities to enhance and to enrich not only the students but of every other individual with whom the students would make contacts during their learning. The outcomes of the proposed programme are designed to contribute significantly towards societal outlook and environmental responsibility, and more importantly, towards the Information Technology.

As explained earlier, the curriculum for the Bachelor of Information Technology (Hons.) is structured such that it compliments other academic pursuits at the Lincoln University College. A greater portion of the curriculum is devoted to teaching the relationship between the environment and the development of technology in a manner that the students from other technology related department can understand and devise solutions and programs for mitigation that would ultimately have these two disciplines working side by side. The curriculum for Information Technology is also structured such that the students from Faculty of Computer Science from Lincoln University College and from engineering, environment, information technology, social sciences, and law students from outside of the Lincoln University College could enrol in the program to enrich their capacity in the field of Networks in order to broaden their sphere of opportunities in the marketplace. The emphasis of the programme is on improving the quality of life that cuts across all the academic disciplines at Lincoln University College. The ability of the proposed program is to integrate scholars from all the academic disciplines at Lincoln University College as well as attracting scholars from diverse disciplines from the other institutions all over the world that would enable the programme to meet its broad mandate to encourage multi-disciplinary approach and co-curricular activities to enrich the students. Also, the programme requirement of interactions with outside agencies and private sector would only add to strengthen this mandate.

The Faculty also organises various Co-curriculum activities for the students as part of their complete study such as cultural events, traditional gatherings and sports activities regularly.

2.3.1 How are external sources engaged in the needs analysis for this programme? How are their commentaries utilized to improve the programme?

External sources (professional bodies) will monitor our programme and check everything related and shall support the programme. Other than that, external sources also see how the programme runs. After that they analyze upon the programme.

Reports from professional bodies are used for accreditation purposes and their reports are utilized for further improvement of the programme. Reports from external examiners are used by the department to improve the curriculum to address shortcomings and add current and relevant materials.

The following are examples of modes of interaction with these stakeholders:

PROGRAMME DESCRIPTION

FIRST SEMESTER

S.N	MODULE NAME	Module Code	CREDIT
1	Business English	BIT 113	3
2	Computer Network	BIT 124	4
3	C-Programming	BIT 115	4
4	Math-I	BIT 116	4
5	Basic Computer Architecture	BIT 112	4
CREDIT			19

SECOND SEMESTER

S.N	MODULE NAME	Module Code	CREDIT
1	Internet Fundamental & Applications	BIT 111	4
2	Math-II	BIT 125	4
3	Advance Computer Network	BIT 121	4
4	Java Programming	BIT 243	4
5	Operating System	BIT 235	3
CREDIT			19

THIRD SEMESTER

S.N	MODULE NAME	Module Code	CREDIT
1	Digital Logic	BIT 126	4
2	Data Structure and Algorithm	BIT 234	4
3	Industrial Management	MWS362	4
4	Web Technology	BIT 233	4
5	E-Commerce	BIT 232	3
CREDIT			19

FOURTH SEMESTER

S.N	MODULE NAME	Module Code	CREDIT
1	Database Management System	BIT 231	4
2	System Analysis and Design	BIT 123	3
3	Technopreneurship	BIT 243	3
4	Compiler & Design Construction	BIT 354	4
5	Artificial Intelligence	BIT 353	4
CREDIT			18

FIFTH SEMESTER

S.N	MODULE NAME	Module Code	CREDIT
1	Software Engineering	BIT 244	4
2	Cyber Security Law & Policy	CSLPA 232	3
3	Cryptography	MWCM353	4
4	Multimedia System	BIT 364	4
5	Leadership Skills and Human Relations	BIT 122	2
CREDIT			17

SIXTH SEMESTER

S.N	MODULE NAME	Module Code	CREDIT
1	Business Research Methods	BIT 356	4
2	Values & Ethics in Profession	VEP 363	3
3	Mobile Computing	BIT 351	4
4	Software Project Management	BIT 362	4
CREDIT			15

SEVENTH SEMESTER

S.N	MODULE NAME	Module Code	CREDIT
1	Management Information System	MIS 114	3
2	System Software and Administration	BIT 472	3
3	Cloud Computing	BIT 361	4
4	Final Year Project	BIT 474	6
CREDIT			16

EIGHT SEMESTER

S.N	MODULE NAME	Module Code	CREDIT
1	Industrial Training	BIT365	6
CREDIT			6

SEMESTER I

1	Name of Course/Module :BUSINESS ENGLISH						
2	Course Code: BIT 113						
3	Name(s) of academic staff:						
4	Rationale for the inclusion of the course /module in the programme: This course module helps to provide the basic language skills to the students and teach them concepts in reading, writing and grammar. This course will also introduce students to new vocabulary and writing styles.						
5	Semester and Year offered: year 1 semester 1						
6	Course Hours	Face to Face				ILT	TSLT
		L	T	P	O		
	L=Lecture T=Tutorial P=Practical O=Others TSLT=Total student learning time	45	16	-	6	61	128
7	Credit Value:3						
8	Prerequisite: Nil						
9	Course Learning Outcomes: On completion of this course students will be able to: <ul style="list-style-type: none"> Analyze the relationship among ideas in written material. Use critical reasoning skills to evaluate what they are reading. Apply study skills to reading assignments. Observe standard mechanical conventions such as spelling and punctuation. 						
10	Transferable Skills: <ul style="list-style-type: none"> Critical Thinking and problem solving skills Communication skills Ethics, moral and professionalism Information management and lifelong learning 						
11	Teaching –learning and assessment strategy <ul style="list-style-type: none"> Lectures Tutorials At the end of the programme, students are given an opportunity to evaluate the course and the lecturer.						
12	Synopsis: Through the use of literature this course will give the students a greater understanding of the English language. There will be focus on paragraph writing and light research topics.						
13	Mode of Delivery: Lectures, Tutorials.						

14	Assessments Methods and Types: Assignments 20% Mid Exam 20% Final Exam 50% Quiz 10% Total 100%							
15	Content Outline of the course/module and the SLT per topic							
	No	Subject description	Face to face				ILT	Total
			Lecture	Tutorial	Practical	Others		
	1	Grammar: <ul style="list-style-type: none">• Verb Non- Finites• To-infinitives and Gerund• Parts of speech:<ul style="list-style-type: none">– Nouns– Pronouns– Verbs– Adjectives– Adverbs and interjections– Conjunctions and their use– Prepositions– Idioms and Phrases• Punctuations<ul style="list-style-type: none">– Capitalizations, Commas, Periods, Inverted Commas, Colons, Semi-colons, Parenthesis, Apostrophes, Dash, Hyphen etc and their use• Sentence types<ul style="list-style-type: none">– Simple, Compound, Complex, Sentence fragments, Relatives– Subject Verb Agreement– If clause and causatives– Parallel structures– Faulty sentences– Modifiers– Degree of adjectives– Tense and aspects– Voice and use– Reported Speech– Articles	12	2	-	-	14	28

	2	Negotiating: <ul style="list-style-type: none"> Key negotiating language, framing your argument Negotiating with suppliers Negotiating with customers 	5	2	-	-	7	14
	3.	Writing: <ul style="list-style-type: none"> Paragraphs Mechanism Essays Business Correspondence <ul style="list-style-type: none"> Sales letters Enquiries Orders Complaints Memos and notices Advertisements Job Applications News Responses correspondences 	7	2	-	-	9	18
	4	Meetings: <ul style="list-style-type: none"> Charting, setting the agenda, controlling the conversation Participating, turn-talking, listening and taking notes Being diplomatic, agreeing and disagreeing 	4	2	-	-	6	12
	5.	Business Correspondence: <ul style="list-style-type: none"> Emails, register, style, standard phasing Notes and memos Business-specific language phrases 	4	2	-	-	6	12
	6.	Telephoning: <ul style="list-style-type: none"> Checking & clarifying information Finance specific scenarios Listening to different accents, intonation 	4	2	-	-	6	12
	7.	Making presentations: <ul style="list-style-type: none"> Introducing a topic effectively Linking and sequencing ideas Concluding Responding to questions 	5	2	-	-	7	14

	8.	Process Management: <ul style="list-style-type: none"> Describing processes, cause and effect Criticizing, recommending Quality assurance, continuous Improvement 	4	2	-	-	6	12
		Total	45	16	-	-	61	122
16.	Main references supporting the course: <ul style="list-style-type: none"> Business English 13th Edition by Mary Ellen Guffey (Author), Carolyn M. Seefer (Author) Business English for Success Scott McLean, Arizona Western College Copyright Year: 2011 							

1	Name of Course/Module :COMPUTER NETWORK						
2	Course Code: BIT 124						
3	Name(s) of academic staff:						
4	Rationale for the inclusion of the course /module in the programme: The course module includes learning about computer network organization and implementation, obtaining a theoretical understanding of data communication and computer networks and gaining practical experience in installation, monitoring, and troubleshooting of current LAN systems.						
5	Semester and Year offered: year 1 semester 1						
6	Course Hours	Face to Face				ILT	TSLT
		L	T	P	O		
	L=Lecture T=Tutorial P=Practical O=Others TSLT=Total student learning time	48	6	27	6	81	168
7	Credit Value:4						
8	Prerequisite: Nil						
9	Course Learning Outcomes: On completion of this course students will be able to: <ul style="list-style-type: none"> Describe general components of network. Demonstrate the techniques for data encapsulation and data access. Identify the various OSI layers used for life learning process. 						
10	Transferable Skills: <ul style="list-style-type: none"> Critical Thinking & Problem Solving Skills Information Management & Life Long Learning Evaluating results 						
11	Teaching –learning and assessment strategy <ul style="list-style-type: none"> Lectures Tutorials At the end of the programme, students are given an opportunity to evaluate the course and the lecturer.						
12	Synopsis: This module focuses on developing knowledge of IP addressing schemes, switching technologies and router operations required to understand small-to-medium business networks, including wireless local area networks (WLAN) and foundational network security.						
13	Mode of Delivery: Lectures, Tutorials, Practical.						

14	Assessments Methods and Types: Assignments 20% Mid Exam 20% Final Exam 50% Quiz 10% Total 100%							
15	Content Outline of the course/module and the SLT per topic							
	No	Subject description	Face to face				ILT	Total
			Lecture	Tutorial	Practical	Others		
	1	Network Today: <ul style="list-style-type: none">How Network affects our lives<ul style="list-style-type: none">Network ComponentsNetwork Representations and TopologiesNetwork TypesCurrent Network Trends	2	-	2	-	4	8
	2	Network Protocols and Models: <ul style="list-style-type: none">RulesProtocolsProtocol SuitesStandard organizationReference ModelsData EncapsulationData Access	3	2	-	-	5	10
	3.	OSI Layers: <ul style="list-style-type: none">Physical layerData link layerNetwork layerTransport layerApplication layer	5	-	1	-	6	12
	4.	Number system: <ul style="list-style-type: none">Binary number systemHexadecimal number system	2	-	1	-	3	6
	5.	Ethernet Switching: <ul style="list-style-type: none">Ethernet framesEthernet MAC addressMAC address tableSwitch speed and forwarding methods	3	-	1	-	4	8

	6..	IP Addressing: <ul style="list-style-type: none"> • IPv4 Addressing • IPv4 Address Structure • IPv4 Unicast, Broadcast and Multicast • Types of IPv4 Addresses • Network Segmentation • Subnetting and VLSM • IPv6 Addressing • Issues with IPv4 Addressing • IPv6 Address Representation • IPv6 Address Types • GUA and LLA Static Configuration • IPv6 Multicast Addresses • Subnetting an IPv6 Address 	4	-	3	-	7	14
	7.	Switching Concepts: <ul style="list-style-type: none"> • Frame forwarding • Collision and broadcast domains 	2	1	-	-	3	6
	8.	Basic switch and end Device Configuration: <ul style="list-style-type: none"> • Switch Access Mechanisms • Command Structure • Ports and Interfaces • Configuring Basic (hostname, Users, Banners, Passwords, Device access) • Managing Address for accessing device • Saving Configurations 	2	-	2	-	4	8
	9.	Address Resolution: <ul style="list-style-type: none"> • MAC and IP address • ARP functions 	1	-	1	-	2	4
	10.	ICMP: <ul style="list-style-type: none"> • ICMP messages • Use case of ICMP messages 	1	-	1	-	2	4
	11.	Basic Router Configurations: <ul style="list-style-type: none"> • Configuring Router Basics • Configuring Interfaces • Configuring Default Gateway 	1	-	1	-	2	4

12.	VLANs: <ul style="list-style-type: none"> Understanding VLANs Configuring VLANs and Trunks Dynamic Trunking Protocols 	1	-	1	-	2	4
13.	Inter-VLAN Routing: <ul style="list-style-type: none"> Inter-vlan Routing concepts Router-on-a-stick implementation Inter-vlan routing using layer 3 switch 	1	-	1	-	2	4
14.	STP: <ul style="list-style-type: none"> Understanding STP and its purposes Operation of STP Evolution /variants of STP 	2	1	-	-	3	6
15.	Ether Channel/Link Aggregation: <ul style="list-style-type: none"> Ether channel operation Configuring ether channel Verifying and troubleshooting ether channel 	2	-	2	-	4	8
16.	Dynamic Address Assignment: <ul style="list-style-type: none"> Dynamic Addressing for IPv4 DHCPv4 concepts Configuring DHCPv4 Server Configuring DHCPv4 Clients Dynamic Addressing for IPv6 IPv6 GUA Assignment SLAAC DHCPv6 Concepts Configuring DHCPv6 Clients 	3	-	4	-	7	14
17.	First Hop Redundancy Protocol: <ul style="list-style-type: none"> Understanding FHRP HSRP Overview 	1	1	-	-	2	4
18.	WLAN Concepts: <ul style="list-style-type: none"> Introduction to Wireless WLAN Components WLAN Operations CAPWAP Operation Channel Management Configuring WLAN on Standalone Environment Configuring WLAN using WLC 	5	-	3	-	8	16

	19.	Routing Concepts: <ul style="list-style-type: none"> • Path Determination in Router • Router Function • Concept of Best Path in Routing • Significance of Routing Table 	3	2	-	-	5	10
	20.	Static/Dynamic Routing: <ul style="list-style-type: none"> • Static Routing Overview • Configuring IP Static Routes • Configuring Default Static Routes • Configuring Floating Static Routes • Dynamic Routing Overview 	4	-	3	-	7	14
		Total	48	6	27	-	81	162
16.	Main references supporting the course: <ul style="list-style-type: none"> • Computer Networks by Andrew S Tanenbaum. 							

1	Name of Course/Module :C-PROGRAMMING						
2	Course Code: BIT 115						
3	Name(s) of academic staff:						
4	Rationale for the inclusion of the course /module in the programme: This course introduces the C programming language features with the structure of C program and C program execution.						
5	Semester and Year offered: year 1 semester 1						
6	Course Hours	Face to Face				ILT	TSLT
		L	T	P	O		
	L=Lecture T=Tutorial P=Practical O=Others TSLT=Total student learning time	39	6	36	6	81	168
7	Credit Value:4						
8	Prerequisite: Nil						
9	Course Learning Outcomes: On completion of this course students will be able to: <ul style="list-style-type: none">• Demonstrate an understanding of computer programming language concepts.• Design computer programs, analyzes, and interprets the concept of pointers, declarations, initialization, operations on pointers and their usage in a professional manner.• Develop confidence for self-education and ability for life-long learning needed for Computer language.						
10	Transferable Skills: <ul style="list-style-type: none">• Critical Thinking and Problem Solving Skills• Information Management & Lifelong Learning• Leadership Skills						
11	Teaching –learning and assessment strategy <ul style="list-style-type: none">• Lectures• Tutorials At the end of the programme, students are given an opportunity to evaluate the course and the lecturer.						
12	Synopsis: This course provides a comprehensive introduction to the C language, emphasizing portability and structured design. Students are introduced to all major language elements including fundamental data types, flow control, and standard function libraries.						
13	Mode of Delivery: Lectures, Tutorials, Practical.						

14	Assessments Methods and Types: Assignments 20% Mid Exam 20% Final Exam 50% Quiz 10% Total 100%							
15	Content Outline of the course/module and the SLT per topic							
	No	Subject description	Face to face				ILT	Total
			Lecture	Tutorial	Practical	Others		
	1	Problem solving with computer: <ul style="list-style-type: none">• Problem analysis• Algorithm and flowchart• Coding, compilation and execution• History of C• Structure of C program, executing C Program	5	3	-	-	8	16
	2	Elements of C: <ul style="list-style-type: none">• C Standards (ANSI C and C99)• C Character Set• C Tokens• I/O using scanf and printf• Escape Sequence, Delimiters• Variables, Data Types (Basic, Derived and User Defined)• Constants/Literals	5	3	-	-	8	16
3.	Operators and Expressions: <ul style="list-style-type: none">• Introduction to operators• Arithmetic Operators• Relational Operators• Logical Operators• Assignment Operators• Increment and decrement operators (Unary Operators)• Bitwise Operators• Shift Operators• Miscellaneous Operators• Operator Precedence and Associativity	4	-	5	-	9	18	

	4	Control Statements: <ul style="list-style-type: none"> Decision making statements Loop or Iteration or Repeating Construct Break and Continue Statement goto Statement Switch Statement 	4	-	5	-	9	18
	5.	Function: <ul style="list-style-type: none"> Introduction to Function Advantages of Function Function Call and Definition Nested and Recursive Function Categories of Function according to Return Type Concept of Local, Global, Static and Register Variables Categories of Function according to Arguments 	5	-	6	-	11	22
	6.	Arrays & Strings: <ul style="list-style-type: none"> Introduction to Array Types of Array (Single and Multidimensional) Declaration and Memory Representation of Array Passing Array to Function String Introduction String Library Functions 	4	-	5	-	9	18
	7.	Pointer: <ul style="list-style-type: none"> Introduction to Pointer Pointer Declaration Initialization Pointers Pointer and Arrays Arrays of Pointer Pointers as Function Arguments String and Pointer Dynamic Memory Allocation (DMA) Application of Pointer Advantages of Pointer 	5	-	6	-	11	22

	8.	Structure and Union: <ul style="list-style-type: none">• Introduction to Structure• Defining a Structure• Structure Initialization• Arrays of Structure• Passing Arrays of Structure to Function• Nested Structure• Pointer to Structure	4	-	5	-	9	18
	9.	File Handling in C: <ul style="list-style-type: none">• Concept in File• Opening and Closing of File• Input/Output Operation in File• Random Access in File• Errors in File, Error Handling in File	3	-	4	-	7	14
		Total	39	6	36	-	81	162

16.	Main references supporting the course: <ul style="list-style-type: none">• “The C Programming Language” by Brian W Kernighan / Dennis Ritchie• “Let Us C” by YashavantKanetkar• “The C++ Programming Language” by STROUSTRUP• “C++: The Complete Reference, 4th Edition” by Herbert Schildt• “Programming: Principles and Practice Using C++” by BjarneStroustrup							
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1	Name of Course/Module :MATH I						
2	Course Code: BIT 116						
3	Name(s) of academic staff:						
4	Rationale for the inclusion of the course /module in the programme: This course enables students to learn numeric sciences, using a range of different approaches including algebra, calculus and basic arithmetic.						
5	Semester and Year offered: year 1 semester 1						
6	Course Hours	Face to Face				ILT	TSLT
		L	T	P	O		
	L=Lecture T=Tutorial P=Practical O=Others TSLT=Total student learning time	65	16	-	6	81	168
7	Credit Value:4						
8	Prerequisite: Nil						
9	Course Learning Outcomes: On completion of this course students will be able to: <ul style="list-style-type: none">Analyse problems using multiple mathematical and statistical representations of relevant structures and relationships and solve using standard techniques.Identify the basic computations in higher mathematics.Use mathematical ideas to model real-world problems.						
10	Transferable Skills: <ul style="list-style-type: none">Problem SolvingThinking logically within constraintsInformation Management & Lifelong LearningEvaluating results						
11	Teaching –learning and assessment strategy <ul style="list-style-type: none">LecturesTutorials At the end of the programme, students are given an opportunity to evaluate the course and the lecturer.						
12	Synopsis: This modules deal with the logic of shape, quantity and arrangement. It offers students new insights into important and widely used mathematical concepts with a strong focus on numerical and algebraic relationships.						
13	Mode of Delivery: Lectures, Tutorials.						

14	Assessments Methods and Types: Assignments 20% Mid Exam 20% Final Exam 50% Quiz 10% Total 100%							
15	Content Outline of the course/module and the SLT per topic							
	No	Subject description	Face to face				ILT	Total
			Lecture	Tutorial	Practical	Others		
	1	Function of One Variables: <ul style="list-style-type: none">Four ways of representing a functionLinear mathematical modelPolynomial , rational, trigonometric, exponential and logarithmic functionsCombination of functions, range and domain of functions and their graphs	10	2	-	-	12	24
	2	Limits and Continuity: <ul style="list-style-type: none">Precise Definition of LimitLimits at InfinityContinuityHorizontal Asymptotes, vertical Asymptotes	5	2	-	-	7	14
	3.	Derivatives: <ul style="list-style-type: none">Tangents and VelocityRate of ChangeReview of DerivativeDifferentiability of a FunctionMean Value theoremIndeterminate Forms and L Hospital Rule	8	2	-	-	10	20
4.	Applications of Derivatives: <ul style="list-style-type: none">Curve SketchingReview of Maxima and Minima of one VariableOptimization ProblemsNewton's Method	8	2	-	-	10	20	

5.	Anti-Derivatives: <ul style="list-style-type: none"> Review of Anti Derivatives Rectilinear Motion Indefinite Integrals and Net Change Definite Integral The Fundamental Theorem of Calculus Improper Integrals 	10	2	-	-	12	24
6.	Applications of Anti Derivatives: <ul style="list-style-type: none"> Areas Between the Curves Volumes of Cylindrical Cells Approximate Integration, Arc Length Area of Surface of Revolution 	7	2	-	-	9	18
7.	Ordinary Differential Equations: <ul style="list-style-type: none"> Introduction Introduction to First Order Equations Separable Equations Linear Equations, Second Order Linear Differential Equations Non Homogeneous Linear Equations Methods of Undetermined Coefficients 	7	2	-	-	9	18
8.	Infinite Sequence and Series: <ul style="list-style-type: none"> Infinite Sequence and Series Convergence Tests and Power Series Taylor's and Maclaurin's Series 	10	2	-	-	12	24
	Total	65	16		-	81	162

16.	<p>Main references supporting the course:</p> <ul style="list-style-type: none"> • Elementary Analysis: The Theory of Calculus by Kenneth Ross • Principles of Mathematical Analysis by Walter Rudin • Understanding Analysis by Stephen Abbott • Real Mathematical Analysis by Charles Chapman Pugh • Metric Spaces by E.T. Copson • Real Analysis by N.L. Carothers (DOVER) • Real and Complex Analysis by Walter Rudin • Real Analysis: Modern Techniques and Their Applications by Gerald B. Folland • Real Analysis by Richard F. Bass • The Elements of Integration and Lebesgue Measure by Robert G. Bartle • Measure Theory by Donald L. Cohn • Measure Theory by J.L. Doob (Particularly good for students interested in Probability Theory) • Measure Theory by Paul R. Halmos • Harmonic Analysis: Real-Variable Methods, Orthogonality, and Oscillatory Integrals by Elias M. Stein
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1	Name of Course/Module :BASIC COMPUTER ARCHITECTURE						
2	Course Code: BIT 112						
3	Name(s) of academic staff:						
4	Rationale for the inclusion of the course /module in the programme: This course introduces the fundamental concepts behind the design working and organization of a computer system. It provides instruction set architecture, memory hierarchies and interconnection.						
5	Semester and Year offered: year 1 semester 1						
6	Course Hours	Face to Face				ILT	TSLT
		L	T	P	O		
	L=Lecture T=Tutorial P=Practical O=Others TSLT=Total student learning time	54	23	4	6	81	168
7	Credit Value:4						
8	Prerequisite: Nil						
9	Course Learning Outcomes: On completion of this course students will be able to: <ul style="list-style-type: none">Gain the concept on pipelining and parallel computing.Identify the structure, function and characteristics of computer systems.Analyse the elements of modern instructions sets and their impact on processor design.						
10	Transferable Skills: <ul style="list-style-type: none">Problem SolvingCritical thinking and problem solving skillsInformation management and lifelong learningEvaluating results						
11	Teaching –learning and assessment strategy <ul style="list-style-type: none">LecturesTutorials At the end of the programme, students are given an opportunity to evaluate the course and the lecturer.						
12	Synopsis: This course gives the fundamental knowledge concern with the way the hardwarecomponents are connected together to form a computer system and how they interact to provide the processing needs of the user. It includes the topics like concepts & terminology, memory unit, primary and secondary storage devices, motherboards.						
13	Mode of Delivery: Lectures, Tutorials, Practical.						

14	Assessments Methods and Types: Assignments 20% Mid Exam 20% Final Exam 50% Quiz 10% Total 100%							
15	Content Outline of the course/module and the SLT per topic							
	No	Subject description	Face to face				ILT	Total
			Lecture	Tutorial	Practical	Others		
	1	Concepts & Terminology: <ul style="list-style-type: none">• Introduction of data and information• Structure of Computer top view<ul style="list-style-type: none">– Top view of CPU– Top view of Control Unit• Stored program concept• Harvard and Von John Neumann structure• History of Computer• Introduction of Number systems: Binary, Decimal, Hexa decimal• Conversion:<ul style="list-style-type: none">– Decimal to Binary, Decimal to Octal and Decimal to Hexa-Decimal and vice versa– Binary to Octal and vice-versa, Octal to Hex and vice versa, Hex to Binary and vice – versa	6	3	-	-	9	18

	2	Processor and organization: <ul style="list-style-type: none"> • Introduction of CPU • CPU terminologies: • CPU components • Registers uses and operations • CPU working principle • System bus • Function of CPU • Instruction set, instruction cycle, Machine cycle • concept of Pipelining and parallel computing • Cache memory and memory hierarchy 	5	2	-	-	7	14
	3.	Memory Unit: <ul style="list-style-type: none"> • Concept of memory • Memory characteristics • Memory slots • Memory terminologies • Memory classifications 	2	2	-	-	4	8
	4	Primary and Secondary Storage Devices: <ul style="list-style-type: none"> • Introduction Primary storage <ul style="list-style-type: none"> – Static RAM – Dynamic RAM • ROM types <ul style="list-style-type: none"> – PROM – EPROM – EEPROM – EAROM – Flash ROM • Secondary storage <ul style="list-style-type: none"> – Magnetic Storage Systems – Optical Storage Systems – Solid-State Storage Devices • Storage Evaluation Criteria • Voice Recognition System • Data Acquisition Sensors • Media Input Devices 	5	2	-	-	7	14

	5.	Motherboards: <ul style="list-style-type: none"> • Introduction, components and Functions of motherboard • Motherboard types and size of form factor • Classification of motherboard • BIOS, its stages and CMOS battery • Manufacturer of motherboard • Daughterboard • Chipset • Northbridge and southbridge motherboard • Expansion slots • Steps of installing motherboard • Uses of jumpers in motherboard 	6	2	-	-	8	16
	6.	General System Architecture: <ul style="list-style-type: none"> • Introduction of GSA(General System Architecture) • Basic principle of Von John Neumann structure • Digital design(logic gates): AND,OR,NOT,NAND,NOR,XOR,XNOR • Combinational and sequential circuits • K-maps • Block diagram of Digital Computer • Instruction and Instruction cycle • Instruction architecture: software and hardware 	6	2	-	-	8	16

	7.	High Level Language: <ul style="list-style-type: none"> • Introduction of computer languages • Types of languages • Types of language translator: assembler, translator and compiler • High level languages features • Pros and cons of HLL • Limitations of HLL 	4	2	-	-	6	12
	8.	Instruction Set Architecture: <ul style="list-style-type: none"> • Introduction of ISA • Block diagram of ISA • Interface design • Instruction set design issues • Evolution of ISA • General architecture: <ul style="list-style-type: none"> – Stack architecture – Accumulator – Memory-Memory architecture – Register-Memory architecture – Load-Store architecture – Registers, memory organization • Types of operand operations • ISA traditional issues 	6	3	-	-	9	18

	9.	Introduction to Parallelism: <ul style="list-style-type: none"> • Introduction of parallel computing • Importance of parallel computing and its classification • Flynn's classification of Parallel Computing • Limitations of Serial Computing • Memory architectures <ul style="list-style-type: none"> – Shared Memory – Distributed Memory – Hybrid Distributed-Shared Memory • Distributed systems and its importance • Types of distributed system • Different types of multiprocessor • Multiprocessor Scheduling • IPC(Inter-Process Communication) 	7	3	-	-	10	20
	10.	Pipelining: <ul style="list-style-type: none"> • Introduction of pipelining • Types of pipelining • Pipelining Considerations • Numericals • Arithmetic pipelining • Instruction pipelining and its steps • Pipelining Conflicts 	4	2	-	-	6	12
	11.	Operating System Installation: <ul style="list-style-type: none"> • Concept of Operation system and its file systems • Hard disk structures • Partitioning & Formatting HD • OS installation steps • OS Troubleshooting 	3	-	4	-	7	14
		Total	54	23	4	-	81	162

16.	Main references supporting the course: <ul style="list-style-type: none">• Computer Architecture: A Quantitative Approach (Paperback) by John L. Hennessy.• Computer Organization & Design: The Hardware/Software Interface• Computer Systems: A Programmer's Perspective (Hardcover) by Randal E. Bryant
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SEMESTER II

1	Name of Course/Module :INTERNET FUNDAMENTAL & APPLICATIONS						
2	Course Code: BIT 111						
3	Name(s) of academic staff:						
4	Rationale for the inclusion of the course /module in the programme: This course gives the fundamental knowledge of internet and its application in global world. It helps to provide general knowledge on different ways to access the Internet.						
5	Semester and Year offered: year 1 semester 1						
6	Course Hours	Face to Face				ILT	TSLT
		L	T	P	O		
	L=Lecture T=Tutorial P=Practical O=Others TSLT=Total student learning time	51	18	11	6	80	166
7	Credit Value:4						
8	Prerequisite: Nil						
9	Course Learning Outcomes: On completion of this course students will be able to: <ul style="list-style-type: none">Describe the fundamental knowledge of internet and its application.Demonstrate the use of real-time chat and briefly describe the history of the wireless Internet.Identify the important features of the Web and Web browser software.Evaluate e-mail software and Web-based e-mail services.						
10	Transferable Skills: <ul style="list-style-type: none">Problem SolvingInformation management and lifelong learningEvaluating results						
11	Teaching –learning and assessment strategy <ul style="list-style-type: none">LecturesTutorials At the end of the programme, students are given an opportunity to evaluate the course and the lecturer						
12	Synopsis: This course module helps students to use and configure web browsers; use the Internet to locate, transfer, and publish information; create a basic HTML document; use e-mail services; and explain issues in choosing an Internet service provider.						
13	Mode of Delivery: Lectures, Tutorials, Practical.						

14	Assessments Methods and Types: Assignments 20% Mid Exam 20% Final Exam 50% Quiz 10% Total 100%							
15	Content Outline of the course/module and the SLT per topic							
	No	Subject description	Face to face				ILT	Total
			Lecture	Tutorial	Practical	Others		
	1	Introduction <ul style="list-style-type: none">• Introduction: Internet; Intranet; Extranet• History: Internet; Intranet; Extranet• Internetworking Protocol: Introduction to TCP/IP. The Internet Architecture: Client, ISP, Regional ISP, and Backbone.• Managing the Internet: Governing bodies of the Internet.• Connecting to Internet: How to connect to the Internet?• Internet Connections: Different internet connections• Internet Address: IP address and domain names.• Internet Services: WWW, Email, FTP, Telnet.• Uses of Internet: Different uses of Internet.	7	2	-	-	9	18
	2	Domain Name System and IP Address: <ul style="list-style-type: none">• Concept of DNS• Concept of IP Address• URL & its Types• IP Address Version: IPv4 & IPv6• IP Address Classes & its types	4	2	-	-	6	12

	3.	Internet concepts: <ul style="list-style-type: none"> • IANA, RIR/NIR/LIR and IPSs for internet number management • Internet access overview • Internet backbone networks: <ul style="list-style-type: none"> – Optical backbone – Marine cables – Teleports – Satellite and terrestrial links 	4	3	-	-	7	14
	4	Internet Security: <ul style="list-style-type: none"> • Introduction to computer security. • Security Threat and Security Attack • Malicious Software: <ul style="list-style-type: none"> – Virus – Worm – Trojan horse • Security Services: <ul style="list-style-type: none"> – Confidentiality – Integrity – Authentication – Non- repudiation • Security Mechanisms Concepts • Cryptography • Digital Signature • Firewall • Users Identification and Authentication • Intrusion Detection Systems. • Security Awareness: <ul style="list-style-type: none"> – Basic concepts • Security Policy: <ul style="list-style-type: none"> – Introduction – Formulating security policy 	7	3	-	-	10	20
	5.	Internet Applications: <ul style="list-style-type: none"> • Introduction to Internet of Things (IoT) • Wearable Computing • Cloud Computing • Internet Relay Chat (IRC) • Social Networking • VOIP 	4	2	-	-	6	12

	6.	Multimedia: <ul style="list-style-type: none"> • Basic concepts • Characteristics of Multimedia • Elements of Multimedia <ul style="list-style-type: none"> – Text – Graphics – Audio – Video – Animation • Multimedia Applications (Scopes) <ul style="list-style-type: none"> – Interactive Multimedia System Development – Game Development – Filmmaking and Animation – Visual Effects – Sound Design – Application UI/UX Design – Graphics Design 	3	-	3	-	6	12
	7.	E-Commerce: <ul style="list-style-type: none"> • Introduction to Electronic Commerce • E commerce framework • Types of E commerce • Electronic Payment Systems: <ul style="list-style-type: none"> – Introduction – Types of electronic payment system – Threat on electronic payment system 	4	2	-	-	6	12
	8.	E-Governance: <ul style="list-style-type: none"> • E-Governance Definition • Needs of E-Governance • Issues in E-Governance applications • Evolution of E-Governance, Its scope and content • Present global trends of growth in E-Governance: Other • E-Governance Practices in Nepal 	4	2	-	-	6	12

9.	Digital Marketing: <ul style="list-style-type: none"> • Introduction to Digital Marketing • Social Marketing and Its types • SEO • Introduction to CRM • Blogging 	4	2	-	-	6	12
10.	Webpage Creation using HTML and CSS: <ul style="list-style-type: none"> • Web Design Principle and Concepts • Introduction to HTML • Elements of HTML (Working with Text, Lists, Tables, Hyperlinks, Images and Multimedia and Forms) • Introduce basics concept of CSS (Creating Style Sheet, CSS Properties) • CSS Styling (Background, Text Format, Controlling Fonts, CSS Id and Class, Border properties, Padding Properties, Margin properties, CSS Color) • Creating page Layout and Site Designs. • Web Page Designing Project 	10	-	8	-	18	36
	Total	51	18	11	-	80	160

16.	Main references supporting the course: <ul style="list-style-type: none"> • Computer Fundamental, Pradeep K. Sinha and PritiSinha • Cryptography & Network Security: Principles and practices, William Stalling • Frontiers of Electronic Commerce, 5th Edition, Kalkotia and Whinston, Pearson Education Asia • Kogent Learning Solutions slnc. HTML 5 in simple steps • Introduction to Computers, Peter Norton, 7th Edition, McGraw Hill Education
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1	Name of Course/Module :MATH II						
2	Course Code: BIT 125						
3	Name(s) of academic staff:						
4	Rationale for the inclusion of the course /module in the programme: This course provides students an introduction to those areas of mathematics which are most important in connection with practical problems.						
5	Semester and Year offered: year 1 semester 2						
6	Course Hours	Face to Face				ILT	TSLT
		L	T	P	O		
	L=Lecture T=Tutorial P=Practical O=Others TSLT=Total student learning time	62	18	-	6	80	166
7	Credit Value:4						
8	Prerequisite: Nil						
9	Course Learning Outcomes: On completion of this course students will be able to: <ul style="list-style-type: none">Describe the algebra and geometry of complex numbers and carry out calculations involving complex numbers in polar and exponential form.Analyse the solution of system of linear equations.Demonstrate least squares method for linear and non-linear data as per lifelong learning.						
10	Transferable Skills: <ul style="list-style-type: none">Critical Thinking & Problem Solving SkillsInformation Management & Life Long LearningEvaluating results						
11	Teaching –learning and assessment strategy <ul style="list-style-type: none">LecturesTutorials At the end of the programme, students are given an opportunity to evaluate the course and the lecturer.						
12	Synopsis: This course main objective is to develop numerical techniques where appropriate and use modern mathematical software packages. This course includes fixed point iteration and convergenceleast squares method for linear and non-linear data.						
13	Mode of Delivery: Lectures, Tutorials.						

14	Assessments Methods and Types: Assignments 20% Mid Exam 20% Final Exam 50% Quiz 10% Total 100%							
15	Content Outline of the course/module and the SLT per topic							
	No	Subject description	Face to face				ILT	Total
			Lecture	Tutorial	Practical	Others		
	1.	Solution of Non - linear equations: <ul style="list-style-type: none">• Introduction• Types of Equation• Errors in Computing• The Bisection Method• False Position Method• Newton-Rapson Method• Solution of System of Nonlinear Equation• Fixed Point Iteration and Convergence	12	3	-	-	15	30
	2.	Interpolation and Approximation: <ul style="list-style-type: none">• Introduction• Errors in Polynomial Interpolation• Lagrange's Polynomials• Newton's Interpolation using Difference and Divided Differences• Cubic Spline Interpolation• Least Squares Method for Linear and Non-Linear Data	11	3	-	-	14	28
	3.	Numerical Difference and Integration: <ul style="list-style-type: none">• Introduction to Numerical Differentiation• Newton's Differentiation Formulas• Numerical Integration (Trapezoidal Rule, Simpson's 1/3 rule, 3/8 rule)• Romberg Integration• Numerical Double Integration	11	3	-	-	14	28

	4.	Matrix and Determinant: <ul style="list-style-type: none"> Review of matrices Some special types of matrices Algebra on matrices Transpose of matrices Rank of matrices Determinant Minor and cofactor Inverse of a matrices 	10	3	-	-	13	26
	5.	Simultaneous Equation: <ul style="list-style-type: none"> Introduction System of linear equations Consistent and inconsistent system Solution of system of linear equations Gauss elimination method 	9	3	-	-	12	24
	6.	Vectors in Space: <ul style="list-style-type: none"> Algebra in vectors in Space Length, Distance between two points, unit vector, Null vector Scalar Product and cross product of two and three vectors Geometrical Interpretations of scalar and cross product 	9	3	-	-	12	24
		Total	62	18	-	-	80	160
16.	Main references supporting the course:							

1	Name of Course/Module :ADVANCE COMPUTER NETWORK						
2	Course Code: BIT 121						
3	Name(s) of academic staff:						
4	Rationale for the inclusion of the course /module in the programme: This module introduces students to advance computer networks and concentrates on building a firm foundation for understanding Data Communications and Computer Networks.						
5	Semester and Year offered: year 1 semester 2						
6	Course Hours	Face to Face				ILT	TSLT
		L	T	P	O		
	L=Lecture T=Tutorial P=Practical O=Others TSLT=Total student learning time	38	2	41	6	81	168
7	Credit Value:4						
8	Prerequisite: Nil						
9	Course Learning Outcomes: On completion of this course students will be able to: <ul style="list-style-type: none"> Analyze OSPF features and characteristics.. Specify and identify deficiencies in existing protocols, and then go onto formulate new and better protocols to overcome deficiencies in existing protocols. Explain the use of cryptography and network security for lifelong learning process. 						
10	Transferable Skills: <ul style="list-style-type: none"> Critical Thinking & Problem Solving Skills Information Management & Life Long Learning Evaluating results 						
11	Teaching –learning and assessment strategy <ul style="list-style-type: none"> Lectures Tutorials At the end of the programme, students are given an opportunity to evaluate the course and the lecturer.						
12	Synopsis: This module provides the student with fundamental knowledge of the various aspects of computer networking and enables students to appreciate recent developments in the area.						
13	Mode of Delivery: Lectures, Tutorials, Practical.						

14	Assessments Methods and Types: Assignments 20% Mid Exam 20% Final Exam 50% Quiz 10% Total 100%							
15	Content Outline of the course/module and the SLT per topic							
	No	Subject description	Face to face				ILT	Total
			Lecture	Tutorial	Practical	Others		
	1.	OSPF: <ul style="list-style-type: none">Understanding OSPF Features and CharacteristicsOSPF OperationsOSPF Router IDOSPF Networks TypesConfiguring Single Area OSPFv2Default Route Propagation	3	-	4	-	7	14
	2.	NAT for IPv4: <ul style="list-style-type: none">IntroductionCharacteristics of NATUnderstanding NAT TypesAdvantages and Disadvantages of NATConfiguring NAT	3	-	4	-	7	14
	3.	WAN Concepts: <ul style="list-style-type: none">Understanding WAN and its PurposesWAN OperationsTraditional and Modern WAN ConnectivityInternet-Based Connectivity	3	-	3	-	6	12
	4.	VPN and IPsec Concepts: <ul style="list-style-type: none">IntroductionVPN TechnologyTypes of VPNsIPsec	2	-	2	-	4	8
5.	Network Design: <ul style="list-style-type: none">IntroductionHierarchical NetworksScalable NetworksUnderstanding Switch and Router Hardware	3	-	3	-	6	12	

	6.	Network Management: <ul style="list-style-type: none"> • Introduction to Network Management • Device Discovery with CDP and LLDP • NTP • SNMP • Syslog • Router and Switch File Maintenance • Managing IOS Image 	4	-	6	-	10	20
	7.	QoS Concepts: <ul style="list-style-type: none"> • Understanding QoS and its Purposes • Traffic Characteristics • Queuing Algorithms • QoS Models • QoS Implementation Techniques 	2	-	3	-	5	10
	8.	ACL Concepts <ul style="list-style-type: none"> • Purpose of ACLs • Understanding Wildcard Masks • ACL Creation Guidelines • Types of IPv4 ACLs • Configuring IPv4 ACLs • Modify IPv4 ACLs • Securing Device with Standard IPv4 ACLs 	4	-	5	-	9	18
	9.	Network Security Concepts <ul style="list-style-type: none"> • Current State of Cybersecurity • Understanding Threat Actors and Tools • Common Network Attacks • IP Vulnerabilities and Threats • TCP and UDP Vulnerabilities • Network Security Best Practices • Cryptography and its uses in secured Communication 	5	-	5	-	10	20

	10.	Network Troubleshooting: <ul style="list-style-type: none"> • Network Documentation • Troubleshooting Process and Tools • Symptoms and Causes of Network Problems • Troubleshooting IP Connectivity 	3	-	3	-	6	12
	11.	Network Virtualization: <ul style="list-style-type: none"> • Cloud Computing • Virtualization • Virtual Network Infrastructure • Software-Defined Networking • Controllers 	3	2	-	-	5	10
	12.	Network Automation: <ul style="list-style-type: none"> • Automation Overview • Data Formats • Understanding APIs and REST • Configuration Management Tools • IBN and Cisco DNA Center 	3	-	3	-	6	12
		Total	38	2	41	-	81	162
16.	Main references supporting the course: <ul style="list-style-type: none"> • Advanced Computer Network: Networking Latest Edition by Rahul Sharma, Manmohan Singh, KassahunGashuMelese 							

1	Name of Course/Module :JAVA PROGRAMMING						
2	Course Code: BIT 243						
3	Name(s) of academic staff:						
4	Rationale for the inclusion of the course /module in the programme: This course provides basic concepts on knowledge of object-oriented paradigm in the Java programming language.						
5	Semester and Year offered: year 1 semester 2						
6	Course Hours	Face to Face				ILT	TSLT
		L	T	P	O		
	L=Lecture T=Tutorial P=Practical O=Others TSLT=Total student learning time	38	-	44	6	82	170
7	Credit Value:4						
8	Prerequisite: Nil						
9	Course Learning Outcomes: On completion of this course students will be able to: <ul style="list-style-type: none"> Identify the structure and model of the Java programming language. Develop software in the Java programming language. Propose the use of certain technologies by implementing them in the Java programming language to solve the problem. 						
10	Transferable Skills: <ul style="list-style-type: none"> Critical Thinking & Problem Solving Skills Information Management & Life Long Learning Evaluating results 						
11	Teaching –learning and assessment strategy <ul style="list-style-type: none"> Lectures Tutorials At the end of the programme, students are given an opportunity to evaluate the course and the lecturer.						
12	Synopsis: This course deals with the programming in the Java programming language. It provides the knowledge about the use of Java in a variety of technologies and on different platforms.						
13	Mode of Delivery: Lectures, Tutorials, Practical.						

14	Assessments Methods and Types: Assignments 20% Mid Exam 20% Final Exam 50% Quiz 10% Total 100%							
15	Content Outline of the course/module and the SLT per topic							
	No	Subject description	Face to face				ILT	Total
			Lecture	Tutorial	Practical	Others		
	1.	Introduction to OOP: <ul style="list-style-type: none">• Introduction to OOP: Classes and Objects• Comparison between structured programming and OOP• Declaring Objects• Member data and functions• Encapsulation• Constructor, destructor and finalize () method• Chain of constructor	8	-	9	-	17	34
	2.	Inheritance & Polymorphism: <ul style="list-style-type: none">• Super class, sub class, inheritance and member access• Types of Inheritance• Extends and Super Keyword• Overriding methods• The object class• Final classes & methods• Abstract classes & methods• Creating & using interface• Method overloading• Up casting & down casting	8	-	9	-	17	34
	3.	String & String Buffer Class: <ul style="list-style-type: none">• String vs String Buffer• Access or Methods• Immutable String• Converting Objects to String• Strings and the Java Compiler	4	-	4	-	8	16

16.	4.	Exception Handling: <ul style="list-style-type: none"> Errors and Exceptions Life cycle of exception Exception hierarchy Catching and handling exceptions Try, catch and finally block Throwing the exception Exception class Creating our own exception 	6	-	7	-	13	26
	5.	Input & Output Streams: <ul style="list-style-type: none"> Representing and managing file paths I/O class hierarchy Byte streams and character streams Exception handling in Java I/O Object serialization 	4	-	5	-	9	18
	6.	Java Collections: <ul style="list-style-type: none"> Java collection and generic Iterating collection List, ArrayList, LinkedList, Set, HashSet, Map Type safety in Java collection Type wildcards 	4	-	5	-	9	18
	7.	Design Pattern: <ul style="list-style-type: none"> Introduction to design pattern Singleton, factory, abstract factory Adapter Composite Decorator Chain of responsibility Observer 	4	-	5	-	9	18
		Total	38	-	44	-	82	164
16.	Main references supporting the course: <ul style="list-style-type: none"> Java : The Complete Reference, 7th edition, Herbert Schildt Java How to Program, 9th edition, Paul Deitel, Harvey Deitel 							

1	Name of Course/Module : OPERATING SYSTEM						
2	Course Code: BIT 235						
3	Name(s) of academic staff:						
4	Rationale for the inclusion of the course /module in the programme: This course offers in depth knowledge on established, convenient and efficient interface between user programs and the bare hardware of the computer on which they run.						
5	Semester and Year offered: year 2 semester 3						
6	Course Hours	Face to Face				ILT	TSLT
		L	T	P	O		
	L=Lecture T=Tutorial P=Practical O=Others TSLT=Total student learning time	45	15	-	6	60	126
7	Credit Value: 3						
8	Prerequisite: Nil						
9	Course Learning Outcomes: On completion of this course students will be able to: <ul style="list-style-type: none"> Describe the fundamental components of a computer operating system. Design and construct the following OS components: System calls, Schedulers, Memory management systems, Virtual Memory and Paging systems useful for lifelong learning process. Analyse theory and implementation of: processes, resource control (concurrency etc.), physical and virtual memory, scheduling, I/O and files in professional manner. 						
10	Transferable Skills: <ul style="list-style-type: none"> Critical Thinking & Problem Solving Skills Information Management & Life Long Learning Ethics, moral and professionalism 						
11	Teaching –learning and assessment strategy <ul style="list-style-type: none"> Lectures Tutorials At the end of the programme, students are given an opportunity to evaluate the course and the lecturer.						
12	Synopsis: This course module acts as a platform of information exchange between computer's hardware and the applications running on it. This module main aim is to make students acknowledge about the purpose, structure and functions of operating systems.						
13	Mode of Delivery: Lectures, Tutorials.						

14	Assessments Methods and Types: Assignments 20% Mid Exam 20% Final Exam 50% Quiz 10% Total 100%							
15	Content Outline of the course/module and the SLT per topic							
	No	Subject description	Face to face				ILT	Total
			Lecture	Tutorial	Practical	Others		
	1.	Operating System Overview: <ul style="list-style-type: none">• Introduction of Operating System and its function• Components of Operating System• Evolution/History of operating system• Types of Operating System• Operating System Structure System Calls <ul style="list-style-type: none">• Definition• Handling System Calls• System calls for Process, File, and Directory Management, System Programs	7	2	-	-	9	18

	2.	Process Management: <ul style="list-style-type: none"> • Introduction to Process, Process Vs Program, Multiprogramming • Process Model, Process Control Block/Process Table • Thread: <ul style="list-style-type: none"> – Definition, Thread Vs Process – User and Kernel Space Threads • Inter Process Communication: <ul style="list-style-type: none"> – Definition – Race Condition and Critical Section • Mutual Exclusion: <ul style="list-style-type: none"> – Mutual Exclusion with Busy Waiting (Disabling Interrupts, Lock Variables, Strict Alteration, Peterson's Solution, Test and Set Lock) – Sleep and Wakeup, Semaphore, Monitors, Message Passing • IPC Problems: <ul style="list-style-type: none"> – Producer Consumer, Sleeping Barber, and Dining Philosopher and Problem • Process Scheduling: <ul style="list-style-type: none"> – Definition – Batch System Scheduling (First-Come First-Served, Shortest Job First, Shortest Remaining Time Next), Interactive System Scheduling (Round-Robin Scheduling, Priority Scheduling, Multiple Queues) 	12	3	-	-	8	16
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	3.	Deadlock: <ul style="list-style-type: none"> • Definition • Deadlock Characterization • Deadlock Conditions • Handling Deadlocks: <ul style="list-style-type: none"> – Ostrich Algorith, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery From Deadlock 	5	2	-	-	7	14
	4.	Memory Management: <ul style="list-style-type: none"> • Memory Management Background • Logical vs. physical address space • Swapping • Contiguous memory allocation • Paging • Segmentation 	5	2	-	-	7	14
	5.	Virtual Memory Management: <ul style="list-style-type: none"> • Background • Paging, page table, page table structure, Demand paging, handling page faults, TLB's • Page replacement algorithm 	3	2	-	-	5	10
	6.	File Systems: <ul style="list-style-type: none"> • File concept, file system, File structure, File types, file attributes, file access methods, Directories structure • Implementation <ul style="list-style-type: none"> – Contiguous allocation – Linked List Allocation (Linked List Allocation using Table in Memory/ File Allocation Table, Inodes.) 	5	2	-	-	7	14

	7.	Device Management: <ul style="list-style-type: none"> • Classification of IO devices, Controllers, Memory Mapped IO, DMA Operation, Interrupts • IO Handling <ul style="list-style-type: none"> – Goals of IO Software, Handling IO(Programmed IO, Interrupt Driven IO, IO using DMA), IO Software Layers (Interrupt Handlers, Device Drivers) • Disk Management <ul style="list-style-type: none"> – Disk Structure, Disk Scheduling (FCFS, SSTF, SCAN, CSCAN, LOOK, CLOOK), Disk Formatting (Cylinder Skew, Interleaving, Error handling), RAID 	8	2	-	-	10	20
		Total	45	15	-	-	60	120

16. **Main references supporting the course:**

- Modern Operating Systems: Andrew S. Tanenbaum, PH1 Publication, Third edition, 2008

Additional References Supporting the Course:

- An Introduction to Operating Systems: Concepts and Practice by Pramod Chandra Bhatt, 2010.
- Operating Systems: Internals and Design Principles by William Stallings, 7thEdition,(2011)

SEMESTER III

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1	Name of Course/Module : DIGITAL LOGIC						
2	Course Code: BIT 126						
3	Name(s) of academic staff:						
4	Rationale for the inclusion of the course /module in the programme: This course is a comprehensive study of the principles and techniques of modern digital systems. This module focuses on general concepts to be used in the design and analysis of digital systems and introduces the principles of digital computer organization and design.						
5	Semester and Year offered: year 1 semester 2						
6	Course Hours	Face to Face				II T	TSLT
		L	T	P	O		
	L=Lecture						
	T=Tutorial						
	P=Practical						
	O=Others						
	TSLT=Total student learning time	39	-	42	6	81	168
7	Credit Value:4						
8	Prerequisite: Nil						
9	Course Learning Outcomes: On completion of this course students will be able to: <ul style="list-style-type: none"> Introduce fundamentals digital logic and switching networks, exposure of Boolean algebra and its application for circuit analysis. Identify the multilevel gates networks, flip-flop, counters and logic device. Demonstrate the acquired knowledge to apply techniques related to the design and analysis of digital electronic circuits. 						
10	Transferable Skills: <ul style="list-style-type: none"> Critical Thinking & Problem Solving Skills Information Management & Life Long Learning Evaluating results 						
11	Teaching –learning and assessment strategy <ul style="list-style-type: none"> Lectures Tutorials At the end of the programme, students are given an opportunity to evaluate the course and the lecturer.						
12	Synopsis: The main objective of this course is to introduce the basic tools for the design of digital circuits and introducing methods and procedures suitable for a variety of digital design applications. It includes binary systems, simplification of Boolean function and combinational logic.						
13	Mode of Delivery:						
	Lectures, Tutorials, Practical.						

14	Assessments Methods and Types: Assignments 20% Mid Exam 20% Final Exam 50% Quiz 10% Total 100%							
15	Content Outline of the course/module and the SLT per topic							
	No	Subject description	Face to face				ILT	Total
			Lecture	Tutorial	Practical	Others		
	1.	Binary Systems: <ul style="list-style-type: none">• Digital Systems• Analog and Digital Signal• Binary Numbers• Number-base Conversions• Octal and Hexadecimal Numbers• Complements• Signed Binary Numbers• Binary Codes• Binary Storage & Registers• Binary Logic• Integrated Circuits	6	-	6	-	12	24

	2.	Boolean Algebra and Logic Gates: <ul style="list-style-type: none"> • Binary Logic • Switching Circuits and Binary Signals • Basic Logic Gates (Digital Logic gates will be covered in detail later) • Graphic Symbols • Timing Diagram • Boolean Algebra • Rule in Boolean Algebra • Boolean Laws • Commutative Law • Associative Law • Postulates • Basic Theorems and Properties of Boolean Algebra • Operator Precedence • Boolean Functions • Universal Gates • IC Digital Logic Families • Propagation Delay 	8	-	8	-	16	32
	3.	Simplification of Boolean Function: <ul style="list-style-type: none"> • SOP and POS • K-Map • NAND and NOR Implementation • Canonical and Standard Forms • Truth Tables • Two – Variable Map • Three – Variable Map • Four – Variable Map 	6	-	6	-	12	24
	4.	Combinational Logic: <ul style="list-style-type: none"> • Introduction to combinational Circuit • Design Procedure • Code Conversion • Analysis Procedure • Obtaining Truth-Table from Logic Diagram • NAND, NOR and Ex-OR Circuits 	6	-	6	-	12	24

16.	5.	Combinational Logic with MSI & LSI: <ul style="list-style-type: none"> • Introduction to MSI and LSI • Binary Adder • Decimal Adder • BCD Adder • Magnitude Comparator • Decoders and Encoders • Multiplexers • Types of ROM • Programmable Logic Array (PLA) 	6	-	6	-	12	24
	6.	Sequential Logic: <ul style="list-style-type: none"> • Introduction to Sequence • Flip-Flops • Point • Edge-Triggered Flip-Flop • Analysis of Clocked Sequential Circuits 	2	-	5	-	7	14
	7.	Registers, Counters and Memory Units: <ul style="list-style-type: none"> • Registers • Ripple Counters • Binary Ripple Counters • Synchronous Counters • Timing Sequences • Johnson Counter • Memory Unit (RAM) 	5	-	5	-	10	20
		Total	39	-	42	-	81	162
16. Main references supporting the course: <ul style="list-style-type: none"> • Digital Logic and Computer Design Book by M. Morris Mano • Fundamentals of Digital Logic with Verilog Design 3rd Edition by Stephen Brown 								

1	Name of Course/Module :DATA STRUCTURE AND ALGORITHM																
2	Course Code: BIT 234																
3	Name(s) of academic staff:																
4	Rationale for the inclusion of the course /module in the programme: This course enable students to provide general techniques for the design of efficient algorithms and in parallel, develop appropriate mathematical tools for analysing their performance.																
5	Semester and Year offered: year 1 semester 2																
6	Course Hours	Face to Face				ILT	TSLT										
		L	T	P	O												
	L=Lecture T=Tutorial P=Practical O=Others TSLT=Total student learning time	42	2	37	6	81	168										
7	Credit Value:4																
8	Prerequisite: Nil																
9	Course Learning Outcomes: On completion of this course students will be able to: <ul style="list-style-type: none">Describe the techniques of algorithm analysis.Analyze the design and performance of various searching and sorting algorithms.Use mathematical techniques to analyse the efficiency of the various algorithms presented.																
10	Transferable Skills: <ul style="list-style-type: none">Critical Thinking & Problem Solving SkillsInformation Management & Life Long LearningEvaluating results																
11	Teaching –learning and assessment strategy <ul style="list-style-type: none">LecturesTutorials At the end of the programme, students are given an opportunity to evaluate the course and the lecturer.																
12	Synopsis: This module broadens and deepens the study of algorithms and data structures. The focus is on algorithms more than data structures. It covers the topics like stacks, queue, linear list and recursion.																
13	Mode of Delivery: Lectures, Tutorials, Practical.																
14	Assessments Methods and Types: <table><tr><td>Assignments</td><td>20%</td></tr><tr><td>Mid Exam</td><td>20%</td></tr><tr><td>Final Exam</td><td>50%</td></tr><tr><td>Quiz</td><td>10%</td></tr><tr><td>Total</td><td>100%</td></tr></table>							Assignments	20%	Mid Exam	20%	Final Exam	50%	Quiz	10%	Total	100%
Assignments	20%																
Mid Exam	20%																
Final Exam	50%																
Quiz	10%																
Total	100%																
	Content Outline of the course/module and the SLT per topic																

15	No	Subject description	Face to face				ILT	Total
			Lecture	Tutorial	Practical	Others		
	1.	Introduction to Data Structure and Algorithm: <ul style="list-style-type: none"> Data Structure, ADT, Atomic and Composite Algorithms, Time & Space Complexity Pseudo Code 	4	2	-	-	6	12
	2.	Stacks: <ul style="list-style-type: none"> Basic Concept of Stack Stack ADT Stack Operations Stack Application Conversion From Infix to Postfix/Prefix Expression Evaluation of Postfix/Prefix 	5	-	5	-	10	20
	3.	Queue: <ul style="list-style-type: none"> Basic Concept of Queue Queue as ADT Primitive Operation Linear Queue Priority Queue Circular Queue Application of Queue 	5	-	5	-	11	22
	4.	Linear List: <ul style="list-style-type: none"> Basics Concept of List Linked List ADT Types of Linked List: Singly Linked List, Double Linked List and Circular Linked List Basic Operation in Linked List: Node Creation, Insertion and Deletion at Beginning, End and Intermediate Position 	6	-	6	-	12	24
	5.	Recursion: <ul style="list-style-type: none"> Principle of Recursion Comparison between Recursion Vs. Iteration Factorial, Fibonacci, GCD, Tower of Hanoi 	4	-	5	-	18	20

6.	Sorting: <ul style="list-style-type: none"> General Concept Internal and External Sort Sorting Algorithm: Bubble sort, Selection and Insertion Sort Divide and Conquer Sort: Merge Sort 	5	-	5	-	10	20
7.	Graphs and Tree: <ul style="list-style-type: none"> Concept and representation of Graphs Graphs Traversal Minimum Spanning Tree: Kruskal Algorithm Shortest Path Algorithm: Dijkstra's Algorithm Definition of Tree, Tree Height, Level and Depth, Basic Operation in Binary Tree Tree Traversals, Binary Search Tree, AVL Tree, Application of Tree 	8	-	6	-	14	28
8.	Searching and Hashing: <ul style="list-style-type: none"> Definition of Searching Search Algorithm: Sequential and Binary Search Concept of Hash: Hash Function, Hash Tables, Collision Resolution Techniques 	5	-	5	-	10	20
	Total	42	2	37	-	81	162
16.	Main references supporting the course: <ul style="list-style-type: none"> Problem Solving with Algorithms and Data Structure Using Python SECOND EDITION 2nd Edition by Bradley N. Miller, David L. Ranum, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein Algorithms Unlocked by Thomas H. Cormen 						

INDUSTRIAL MANAGEMENT

UNIT 1: Basic of Industrial Management

1. Definition of management
2. Characteristics of management
3. Functions of management
4. Planning
5. Organizing
6. Staffing
7. Directing
8. Coordination
9. Controlling
10. Motivating

UNIT 2: Strategic Management

1. Concept and Characteristics of strategic management –Defining strategy – Mintzberg's 5P's of strategy – Corporate, Business and Functional Levels of strategy - Strategic Management Process. Preparing an Environmental Threat and Opportunity Profile (ETOP)
2. Industry Analysis - Porter's Five Forces Model of competition. BCG Matrix – GE 9 Cell Model -Balanced Scorecard, Generic Competitive Strategies: Low cost, Differentiation, Focus.

UNIT 3: Organization and Management

1. Managing and managers: organization and management, management process, management level and skills, the challenges of management, social responsibility and ethics.
2. The evolution of management theory: scientific management school, classical organization theory school, behavioral school, management science school, recent developments in management theories.
3. Decision making: Problems and opportunities finding, nature of managerial decision making, certainty, risk and uncertainty in decision making, rational model of decision making.

UNIT 3: Production and Operation Management (POM)

3. Production and operations strategy and interfaces: production/operation function and the organization, production / operation strategy, planning and controlling, the operations, POM & financial management, POM in manufacturing and service environments
4. Plant and facilities: Location and design of the plant or facilities, layout of the facilities, equipment selection, maintenance of the facilities and equipment

UNIT 4: Marketing Research and Forecasting

1. The role of marketing in organizations and society: marketing management process, marketing concept, marketing and society

2. Marketing strategy: analyzing strategic business modules, selecting marketing strategies
3. Customer analysis: identifying customers, identifying customers buying behaviors, customers oriented organization
4. Product development and testing: product life cycle, product development process, marketing interfaces with R&D.

UNIT 5: Human Resource Management

1. Strategic importance HRM; objectives of HRM; challenges to HR professionals; role, Responsibilities and competencies of HR professionals; HR department operations;
2. Human Resource Planning - objectives and process; human resource information system.. Talent acquisition; recruitment and selection strategies, career planning and management, , training and development, investment in training programme; executive development.
3. Basic psychology in organizations: social perception, learning, personality
4. Motivation: basic human needs, equity theory, expectancy theory, job enlargement and job enrichment.

UNIT 6: Quality Management

1. Evolution of Quality Management
2. Quality – Definitions
3. Total Quality Management
4. Forecasting and Forecasting Techniques
5. Forecast Errors
6. The ISO 9001:2000 Quality Management System Standard- The ISO 14001:2004 Environmental Management System Standard- ISO 27001:2005 Information Security Management System

UNIT 7: Management Information Systems

1. Concept of data and information, characteristics of information, types of information, Definition of MIS, Need,
2. Purpose and Objectives,
3. Contemporary Approaches to MIS,
4. Components of an information system,
5. Need to study information systems, Classification of information systems, Functional Business systems – sales & marketing, Human resources, accounting, manufacturing etc.
6. Decision-making models, Types of decisions, Decision Support Systems, Introduction to e-commerce, types – B2B, B2C, C2B, C2C etc. Overview of ERP, Business Process Re-engineering

References:

1. P. Khanna, J.C. Kapur , “Industrial Engineering and Management”, 5th edition, Dhanpat Rai & Sons 1995
2. Gavriel Salvendy, “Hand Book of Industrial Engineering & Management”, John willy and sons, 1982

3. P. Khanna, Industrial Engineering and Management Dhanpat Rai and Sons 1995.
4. E. Adam, Jr, & R.J. Ebert "Production and Operation Management" Prentice Hall 1993.

1	Name of Course/Module : WEB TECHNOLOGY						
2	Course Code: BIT233						
3	Name(s) of academic staff:						
4	Rationale for the inclusion of the course /module in the programme: This course is designed to start students on a path toward future studies in web development and design. It provides overall view on the internet and the web.						
5	Semester and Year offered: year 2 semester 3						
6	Course Hours	Face to Face				ILT	TSLT
		L	T	P	O		
	L=Lecture T=Tutorial P=Practical O=Others TSLT=Total student learning time	47	12	21	6	80	166
7	Credit Value:4						
8	Prerequisite: Nil						
9	Course Learning Outcomes: On completion of this course students will be able to: <ul style="list-style-type: none"> Identify the structure and functionality of the world wide web Create dynamic web pages using a combination of HTML, CSS, and JavaScript. Develop a dynamic webpage by the use of java script and DHTML. 						
10	Transferable Skills: <ul style="list-style-type: none"> Critical Thinking & Problem Solving Skills Information Management & Life Long Learning Leadership Skills Evaluating results 						
11	Teaching –learning and assessment strategy <ul style="list-style-type: none"> Lectures Tutorials At the end of the programme, students are given an opportunity to evaluate the course and the lecturer.						
12	Synopsis: This course module helps students to be familiar with client server architecture and able to develop a web application using java technologies. Students will gain the skills and project-based experience needed for entry into web application and development careers.						
13	Mode of Delivery: Lectures, Tutorials, Practical.						

14	Assessments Methods and Types: Assignments 20% Mid Exam 20% Final Exam 50% Quiz 10% Total 100%							
15	Content Outline of the course/module and the SLT per topic							
	No	Subject description	Face to face				ILT	Total
			Lecture	Tutorial	Practical	Others		
	1.	An Overview of the Internet and the web: <ul style="list-style-type: none">• Evolution, Advantage and Disadvantage of Internet• Intranet , Extranet and Intranet• DNS and IP• URL• Internet Services• WWW• Web Pages Static and Dynamic Web Pages• Web Browser• Search Engine	6	2	-	-	8	16
	2.	Website Development Process: <ul style="list-style-type: none">• Introduction• Gathering Information• Planning Design• Content Writing and Assembly• Coding• Testing, Review, and Launch• Maintenance	5	2	-	-	7	14
	3.	Website Structure Design: <ul style="list-style-type: none">• Website Structure• Why Does Your Website's Structure Matter?• Structuring Your Website• Plan Before You Do,• Symmetry Is Key• Pay Attention to Page Slugs• Make Your Menu Front• Center• Keep It Simple	3	2	-	-	5	10

	4.	Website Design Principle: <ul style="list-style-type: none"> Purpose Communication Typefaces Colours Images Navigation Grid based layouts Load time Mobile friendly 	3	-	3	-	6	12
	5.	Webpage Layout: <ul style="list-style-type: none"> Introduction The Zig-Zag Layout The F Layout Full Screen Photo One-Column Layout Featured Image Layout Asymmetrical Layout Split Screen Layout Headline and Thumbnails Gallery Layout Modular Card Layout / Block Layout Magazine Layout Single Page Layout Radial Symmetry Layout 	4	-	5	-	9	18
	6.	Color and Graphics on the web: <ul style="list-style-type: none"> Use of color in web Use of different fonts in web Use of Graphics element Image Tag 	3	-	2	-	5	10
	7.	Audio and Video on web: <ul style="list-style-type: none"> Use of Audio and Video in WEB implementation of Audio and video tags with its attributes 	3	-	2	-	5	10
	8.	User Interface Design: <ul style="list-style-type: none"> Introduction to UI Introduction to UX Different tools for wireframe Design Creating UI From Wireframe 	3	-	3	-	6	12

	9.	Style sheet and controlling Page: <ul style="list-style-type: none"> Using inline style in HTML CSS and its uses CSS for responsive design 	3	-	3	-	6	12
	10.	Form Design: <ul style="list-style-type: none"> Form in Web INPUT tag of HTML and its uses in form Type of input field in form 	3	-	3	-	6	12
	11.	Website Accessibility: <ul style="list-style-type: none"> Accessibility in Context What is Web Accessibility Accessibility is Important for Individuals, Businesses, Society Making the Web Accessible Evaluation Accessibility Examples 	4	2	-	-	6	12
	12.	Website Testing Introduction: <ul style="list-style-type: none"> Functionality Testing Usability testing Interface testing Compatibility testing Performance testing Security Testing Cross Browser Testing 	4	2	-	-	6	12
	13.	Website Usability Evaluation: <ul style="list-style-type: none"> Introduction Focus Groups Card Sorting First Click Testing Recruiting Participants 	3	2	-	-	5	10
		Total	47	12	21	-	80	160
16.	Main references supporting the course: <ul style="list-style-type: none"> Building Websites All-in-One for Dummies by David Karlins, Doug Sahlin 2019 							

1	Name of Course/Module :E-COMMERCE						
2	Course Code: BIT 232						
3	Name(s) of academic staff:						
4	Rationale for the inclusion of the course /module in the programme: This course provides the tools, skills and understanding of technological concepts and issues surrounding the emergence and future directions of electronic business practices, with a strong focus on electronic commerce initiatives.						
5	Semester and Year offered: year 1 semester 2						
6	Course Hours	Face to Face				ILT	TSLT
		L	T	P	O		
	L=Lecture T=Tutorial P=Practical O=Others TSLT=Total student learning time	58	24	-	6	82	170
7	Credit Value:4						
8	Prerequisite: Nil						
9	Course Learning Outcomes: On completion of this course students will be able to: <ul style="list-style-type: none"> Analyze how the internet and e-commerce adds value to an entrepreneur's industry and business. Evaluate critical success factors for maximizing e-commerce initiatives relating to the entrepreneur's business. Develop and apply appropriate e-commerce initiatives to support the entrepreneur's business. 						
10	Transferable Skills: <ul style="list-style-type: none"> Critical Thinking & Problem Solving Skills Information Management & Life Long Learning Evaluating results 						
11	Teaching –learning and assessment strategy <ul style="list-style-type: none"> Lectures Tutorials At the end of the programme, students are given an opportunity to evaluate the course and the lecturer.						
12	Synopsis: This course help student develops an understanding of the current business models, strategies and opportunities in electronic publishing, communication, distribution, collaboration, and online payment options.						
13	Mode of Delivery: Lectures, Tutorials.						

14	Assessments Methods and Types: Assignments 20% Mid Exam 20% Final Exam 50% Quiz 10% Total 100%							
15	Content Outline of the course/module and the SLT per topic							
	No	Subject description	Face to face				ILT	Total
			Lecture	Tutorial	Practical	Others		
	1.	Fundamentals of Electronic Commerce: <ul style="list-style-type: none">• Introduction to E-Commerce<ul style="list-style-type: none">– Definition of E-Commerce– E-Business Vs E-Commerce– Types of E-Commerce– Benefits of E-Commerce– Driving Forces of E-Commerce (Economic, Market, Technology & Society Force)• Internet & Web<ul style="list-style-type: none">– WWW (World Wide Web)– HTML, HTTP• Value Chain of in E-Commerce<ul style="list-style-type: none">– Industry Value Chain– Firm Value Chain• Role of E-Commerce	4	2	-	-	6	12

	2.	Infrastructure for Electronic Commerce: <ul style="list-style-type: none"> Internet, Intranet & Extranet <ul style="list-style-type: none"> Internet & it's stages Uses Internet of Things (IOT) Packet Switching <ul style="list-style-type: none"> TCP/IP Architecture of TCP/IP Client Server Computing The Web <ul style="list-style-type: none"> Hypertext Markup Languages (HTML, XML) Web Client Web Browser Internet & Connection <ul style="list-style-type: none"> Email Instant Messaging Chat & Online Forum 	6	2	-	-	8	16
	3.	Web Based Tools for E-Commerce: <ul style="list-style-type: none"> Introduction to Web Server Web Server Hardware & Architecture Web Server Software <ul style="list-style-type: none"> Apache HTTP IIS Web Server Performance Evaluation Web Client & Web Browser Web Server Feature 	4	2	-	-	6	12
	4.	Electronic Commerce Software: <ul style="list-style-type: none"> Basic Function of E-Commerce Software Advance Function of E-Commerce Software Web Services E-Commerce Software for Small, Mid-Size & High-level Companies Packages Hosting Services 	4	2	-	-	6	12

	5.	Security Threats to E-Commerce: <ul style="list-style-type: none"> • Introduction of Security <ul style="list-style-type: none"> – Security Threats in E-Commerce, Malicious Code Potentially Unwanted Programs, Phishing, Hacking and Cyber Vandalism, Credit Card Fraud/Theft, Spoofing, pharming and Spam(Junk) Web Sites (Link Farms) Identify Fraud, Denial of Service (DoS) and DDoS attacks, Sniffing etc – Security Classification – Security Policy • Intellectual Property in E-Commerce <ul style="list-style-type: none"> – Intellectual Property Rights – Intellectual Property Threats (Online, Domain Name/IP) • Electronic Commerce Threats <ul style="list-style-type: none"> – Client Threats – Communication Channel Threats – Server Threats • CERT Introduction 	8	2	-	-	10	20
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	6.	Implementing Security for E-Commerce: <ul style="list-style-type: none"> Intellectual Property Protection <ul style="list-style-type: none"> Copyright Patent and Trademark law Methods of Protecting Intellectual Digital Work <ul style="list-style-type: none"> Software Metering Digital Watermarks Digital Envelops Transaction Integrity Overview Protecting Electronic Commerce Assets <ul style="list-style-type: none"> Protecting System's Privacy, Integrity and Availability Protecting E-Commerce Server <ul style="list-style-type: none"> Access Control and Authentication Operating System Firewall 	6	2	-	-	8	16
	7.	Electronic Payment System: <ul style="list-style-type: none"> Overview of Payment System Different Payment System Electronic Cash: (ATM, Debit Card, Credit Card, Prepaid Card, Smart Card, Mobile Payment, E-Wallet, Electronic Fund Transfer, Cryptocurrency) Chip Card Vs Magnetic Card Benefits of EPS Uses of Electronic Cash 	4	2	-	-	6	12

	8.	Strategy for Marketing Sales and Promotion: <ul style="list-style-type: none"> E-Commerce Marketing Strategy Opportunity <ul style="list-style-type: none"> Segmentation Online Online Information Product Online Promotion Online Service (Price) Online Distribution (Place) Creating Effective Web Essence <ul style="list-style-type: none"> Site Content Site Code, Columns, Containers Site Page Identification KIS (S) Identifying and Reaching Customers <ul style="list-style-type: none"> Personal Contact Mass Media Technology Enabled Relation Creating and Maintaining Brand on Web and Business Models <ul style="list-style-type: none"> Steps of Reaching Target Market Web Quality and Value Elements of Branding Brand Leveraging Strategy Web Site Naming 	6	2	-	-	8	16
	9.	Strategy for Purchasing and Support: <ul style="list-style-type: none"> Purchasing Logistic and Support Electronic Data Interchange Supply Chain Management Logistic and Support Activities 	4	2	-	-	6	12
	10.	Strategy for Web Auction: <ul style="list-style-type: none"> Virtual Communities and Web Portal Auction Basics WebAuction Strategy Virtual Communities Strategy 	4	2	-	-	6	12

	11.	Environment of Electronic Commerce: <ul style="list-style-type: none">• International Legal• Ethical and Tax Issues• International Nature of E-Commerce , Legal Environment• Ethical Issues, taxation	4	2	-	-	6	12
	12.	Business Plan For Implementing Electronic Commerce: <ul style="list-style-type: none">• Planning• Controlling• Implementing• Evaluation Managing E-Commerce	4	2	-	-	6	12
		Total	58	24	-	-	82	164
	16.	Main references supporting the course: <ul style="list-style-type: none">• Kenneth C. Laudon and Carol GuercioTraver, E-commerce Business Technology Society, Pearson• Gary P. Schneider, Electronic Commerce, Course Technology, Cengage Learning						

SEMESTER IV

1	Name of Course/Module : DATABASE MANAGEMENT SYSTEM						
2	Course Code: BIT 231						
3	Name(s) of academic staff:						
4	Rationale for the inclusion of the course /module in the programme: This course offers the knowledge on fundamental elements of relational database management systems as well as importance of data & data management.						
5	Semester and Year offered: year 2 semester 3						
6	Course Hours	Face to Face				ILT	TSLT
		L	T	P	O		
	L=Lecture T=Tutorial P=Practical O=Others TSLT=Total student learning time	45	11	24	6	80	166
7	Credit Value:4						
8	Prerequisite: Nil						
9	Course Learning Outcomes: On completion of this course students will be able to: <ul style="list-style-type: none">Introduce the fundamental concepts and methods necessary for the design and use of a database system.Demonstrate practical experience in applying these concepts and methods using commercial database management systems.Identify the Advantages & Disadvantages of E-R Data Model.						
10	Transferable Skills: <ul style="list-style-type: none">Critical Thinking & Problem Solving SkillsInformation Management & Life Long LearningEvaluating results						
11	Teaching –learning and assessment strategy <ul style="list-style-type: none">LecturesTutorials At the end of the programme, students are given an opportunity to evaluate the course and the lecturer.						
12	Synopsis: This course introduces the fundamentals of database technology. Topics covered include: database concepts, Database System Architecture, E-R model, relational model, database design theory, database languages, transaction management, concurrency control and database recovery.						
13	Mode of Delivery: Lectures, Tutorials, Practical.						

14	Assessments Methods and Types: Assignments 20% Mid Exam 20% Final Exam 50% Quiz 10% Total 100%							
15	Content Outline of the course/module and the SLT per topic							
	No	Subject description	Face to face				ILT	Total
			Lecture	Tutorial	Practical	Others		
	1.	Introduction to the Database Systems: <ul style="list-style-type: none">• Importance of Data & Data Management• How Data are Stored in Database• Different Database Systems• Physical & Logical Structure of Database• Database Management Systems and Database Systems• Database Architecture• Difference Between Distributed Database & Relational Database• History	6	3	-	-	9	18
	2.	The Relational Data Models: <ul style="list-style-type: none">• Entity Relationship and Object• ER Diagram• Importance of ER Diagram• Relational Model• Advantages and Disadvantages of E-R Data Model	3	-	2	-	5	10

	3.	Relational Algebra & Calculas: <ul style="list-style-type: none"> The fundamental Operations of Relational Algebra Operators: Select, Project, Rename, Union, Intersection, Minus, Cartesian Product, Theta Join, Equijoin, Natural Join, Division Unary & Binary Operator Project Union (Union, Union All, Intersect) Set Different (Minus Operation) Cartesian Product 	5	-	3	-	8	16
	4.	SQL: <ul style="list-style-type: none"> Sql Introduction Types of Sql (DDL, DML, DCL) Execution Process of Sql Execution Process of Sql Sql Fundamentals: Multi table Queries Duplicate Rows Row Selection Search Conditions The Comparison Test (=, <, >, <=, >=) The Range Test (BETWEEN) The Set Membership Test (IN) The Pattern Matching Test (LIKE) The Null Value Test (IS NULL) Compound Search Conditions (AND, OR and NOT) Sorting Query Results (ORDER BY Clause) Developing Sub Queries 	5	-	10	-	15	30
	5.	Conceptual Design: <ul style="list-style-type: none"> Conceptual Design Process Requirement Analysis Identify the Relation 	4	-	2	-	6	12
	6.	Logical Design: <ul style="list-style-type: none"> Logical Design Process Design Entity Relation Diagram Create Tables and Constraint Create Referential Keys 	4	-	3	-	7	14

16.	7.	Normalization: <ul style="list-style-type: none"> • Use of Normalization • Different form of Normalization 	2	-	2	-	4	8
	8.	Database Technology: <ul style="list-style-type: none"> • Different Database Technologies • Database Client & Server Processing • OLAP & OLTP Database Techniques 	3	2	-	-	5	10
	9.	Distributed Architecture: <ul style="list-style-type: none"> • Distributed Database Architecture • Advantages and Disadvantage of Distributed Database 	3	2	-	-	5	10
	10.	Database Evaluation and Transaction: <ul style="list-style-type: none"> • Transaction Management • ACID Properties • Database Evaluation Process 	4	2	-	-	6	12
	11.	Data Analysis: <ul style="list-style-type: none"> • Data Analysis Process • Types of Data Analysis • Data Analysis Steps 	4	2	-	-	6	12
	12.	Database and the World Wide Web: <ul style="list-style-type: none"> • Web Data Management • Web Search • Web Crawling 	2	-	2	-	4	8
		Total	45	11	24	-	80	160
16.	Main references supporting the course: <ul style="list-style-type: none"> • Database System Concepts by Abraham Silberschatz and S Sudarshan. • Database Management Systems by Raghu Ramakrishnan 							

1	Name of Course/Module : SYSTEM ANALYSIS AND DESIGN						
2	Course Code: BIT 123						
3	Name(s) of academic staff:						
4	Rationale for the inclusion of the course /module in the programme: This course enables students to gain knowledge in analytical procedures and designing part of system. It is essential for students to learn the concepts and skills of system analysis design and includes expanded coverage of data flow diagrams, data dictionary and process specifications.						
5	Semester and Year offered: year 2 semester 3						
6	Course Hours	Face to Face				ILT	TSLT
		L	T	P	O		
	L=Lecture T=Tutorial P=Practical O=Others TSLT=Total student learning time	61	19	-	6	80	166
7	Credit Value:4						
8	Prerequisite: Nil						
9	Course Learning Outcomes: On completion of this course students will be able to: <ul style="list-style-type: none"> Gain knowledge in business strategy, business process thinking, change management and many other fields to apply their concepts for analysis of the system and design accordingly. Gain knowledge of analytical and design of system for solving problems and issues in the technical field Solve system related problems with proper analytical skill. 						
10	Transferable Skills: <ul style="list-style-type: none"> Critical Thinking & Problem Solving Skills Information Management & Life Long Learning Evaluating results 						
11	Teaching –learning and assessment strategy <ul style="list-style-type: none"> Lectures Tutorials At the end of the programme, students are given an opportunity to evaluate the course and the lecturer.						
12	Synopsis: This module deals with the variety of new software used by analysts, designers to supervise projects, examine document systems, design new systems and execute their plans. The course consists of SA&D concepts, Roles of system analyst, Managing Data Resources, Software engineering and implementation.						
13	Mode of Delivery: Lectures, Tutorials.						

14	Assessments Methods and Types: Assignments 20% Mid Exam 20% Final Exam 50% Quiz 10% Total 100%							
15	Content Outline of the course/module and the SLT per topic							
	No	Subject description	Face to face				ILT	Total
			Lecture	Tutorial	Practical	Others		
	1.	Overview of System Analysis and Design: <ul style="list-style-type: none">• Introduction to system analysis and design• Information systems and its types• Stakeholders of information systems• Systems development life cycle and life cycle models	8	2	-	-	10	20
	2.	Process and Conceptual Modeling: <ul style="list-style-type: none">• System Analyst• Introduction to data flowdiagram (DFD)• Concepts used in drawingsDFDs• DFD design (up to level2)• Conceptualmodeling• Entity relationshipdiagrams	8	2	-	-	10	20
	3.	Data and Process Modeling: <ul style="list-style-type: none">• Introduction• Overview of data & process modelingtools• Introduction to CASE tools• Role of CASE in data modelling• Data dictionaries	6	2	-	-	8	16
4.	Logic Modeling: <ul style="list-style-type: none">• Decisiontable• Decisiontree• StructuredEnglish	4	2	-	-	6	12	

	5.	Object Modeling: <ul style="list-style-type: none"> • Overview of object-oriented analysis • Object modeling with the unified modeling language <ul style="list-style-type: none"> – Class Diagram – State Diagram – Sequence Diagram – Use case diagram 	6	2	-	-	8	16
	6.	System Analysis: <ul style="list-style-type: none"> • System planning and initial investigation • Project scheduling • Requirement analysis • Types of requirements • Requirement gathering methods • Feasibility study and its types • Steps of feasibility study • Cost/benefits analysis (Direct and Indirect Cost, Tangible and Intangible Benefit)), payback period 	10	3	-	-	13	26
	7.	Systems Design: <ul style="list-style-type: none"> • Introduction to system design • The process and stages of system design • Logical and physical design • Introduction to structured design (modular system design, functional strength, structure chart, cohesion, coupling) • Database design and overview of file organization • Input/output and forms design techniques 	9	3	-	-	12	24

	8.	System Implementation: <ul style="list-style-type: none"> • Introduction to system implementation • System installation and its types • System quality, software quality assurance (formal technical review, walkthrough, inspections) • System maintenance, types of maintenance and process of system maintenance • Introduction to system testing 	10	3	-	-	13	26
		Total	61	19	-	-	80	160

16.	Main references supporting the course: <ul style="list-style-type: none"> • Systems Analysis and Design (9thEdition) by Kenneth E. Kendall and Julie E. Kendall, Prentice Hall; 9th edition (2013). • Systems Analysis and Design by Alan Dennis, Wiley; 5thedition,(2012) • Jeffrey L. Whitten, Loonnie D. Bentley, “<i>System Analysis & Design Methods</i>”, 5th edition • Grady Booch, “<i>Object Oriented Analysis & Design with Application</i>”, Pearson education • Tilley, S., & Rosenblatt, H.J. (2016). <i>Systems Analysis and Design</i>. (11thed.). U.S.A: Cengage Learning 						
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TECHNOPRENEURSHIP

Technopreneurship

Differential between Entrepreneurship and Technopreneurship

Define the concept of technopreneurship

Discuss the traits and characteristics of technopreneurship

Identify the challenges in technopreneurship

Topic 1: Innovation and Ideas

- What is innovation?
- Research vs development – translational research
- Types of innovation: product, process, and business model
- Innovation-driven vs small-medium enterprise
- Organization-driven vs market-driven ideas

Topic 2: Value Proposition

- Benefits vs features, relation to needs, and high value adding
- Solution driven or efficiency improvement
- Value = benefits/cost
- Value proposition statement including Needs, Approach, Benefits per cost, Competition

Topic 3: Customers

- Customer needs, pain points and demographics
- Market research and validation
- The decision-making process
- Target customer profile, persona

Topic 4: Competitive Advantage, Markets

- Classes of competitors=
- Product differentiation, positioning
- Market structures
- Market segments, size
- Beachhead market and creating your market

Topic 5: Introduction to Intellectual Property

- What is IP? why have IP protection? Cost of protection
- Copyright, trademarks
- Patents, trade secrets, contracts, non-disclosure and non-compete agreements

Topic 6: Execution and Business Plan

- Roadmap for research, development, and production
- Budget and timeline
- Sales and marketing plans; cost of customer acquisition, customer lifetime value
- Plans for R&D, operations, sales and marketing, human resources
- Lean concepts and organization

Topic 7: Financial Analysis and Accounting Basics

- Cash flow statements and projection
- Income (P&L) statements; accrual accounting, depreciation, operating expenses
- Balance sheets; equity, liability
- Breakeven time

Topic 8: Raising Capital

- Sources: debt and venture capital
- Incubators, accelerators
- Grants, competitions

ADDITIONAL TOPICS (cover when able or spread out in the course)

Topic 9: The Product or Service

- What is the core that makes it special?
- Minimum viable product and iterative design
- Cost of goods sold
- Product development plan, Gantt chart

Topic 10: IT Business Development Models

- Organize Financial plan for new ventures in technopreneurship
- Time value of money
- Revenue generation
- Price structure; price elasticity
- Channels of distribution
- Strategic partners
- Develop IT Business Plan
- Define the meaning of a Business Plan
- Identify the Importance of a Business
- Explain the Criteria of a good Business
- Determine business plan outline
- Create a IT business plan for a given business

Topic 11: Ethics and social responsibility

- Ethics. codes of ethics; theoretical frameworks; broader ethical considerations
- Social businesses

Topic 12: Globalization

- Cultural differences in communication
- Ethical issues

1	Name of Course/Module : COMPLIER DESIGN AND CONSTRUCTION						
2	Course Code: BIT 354						
3	Name(s) of academic staff:						
4	Rationale for the inclusion of the course /module in the programme: This course is designed to develop acquaintance with fundamental concepts of compiler design. It introduces fundamental concept of compiler and its different phases.						
5	Semester and Year offered: year 3 semester 5						
6	Course Hours	Face to Face				ILT	TSLT
		L	T	P	O		
	L=Lecture T=Tutorial P=Practical O=Others TSLT=Total student learning time	46	3	31	6	80	166
7	Credit Value:4						
8	Prerequisite: Nil						
9	Course Learning Outcomes: On completion of this course students will be able to: <ul style="list-style-type: none">Understand the concepts of formal languages and the techniques of compilation of various high level programming languages.Develop lexical analyzers, parsers and small compilers using different tools.Collect and interpret useful data and to judge information systems and their applicability.						
10	Transferable Skills: <ul style="list-style-type: none">Critical Thinking & Problem Solving SkillsInformation Management & Life Long LearningEvaluating results						
11	Teaching –learning and assessment strategy <ul style="list-style-type: none">LecturesTutorials At the end of the programme, students are given an opportunity to evaluate the course and the lecturer.						
12	Synopsis: The main focus of this course is to introduce the fundamental notions about formal languages (Chomsky classification of Languages, Regular Languages, Automata, context Free Grammars) and understand the mechanisms governing the analysis and synthesis of programming languages.						
13	Mode of Delivery: Lectures, Tutorials, practical.						

14	Assessments Methods and Types: Assignments 20% Mid Exam 20% Final Exam 50% Quiz 10% Total 100%							
15	Content Outline of the course/module and the SLT per topic							
	No	Subject description	Face to face				ILT	Total
			Lecture	Tutorial	Practical	Others		
	1.	Introduction to compiling: <ul style="list-style-type: none">CompilersAnalysis of source programPhases of compilerCompiler-construction tools	5	3	-	-	8	16
	2.	Simple One-Pass Compiler: <ul style="list-style-type: none">Syntax DefinitionSyntax directed translationParsingTranslation for simple expressionSymbol TableAbstract Stack Machines	5	-	4	-	9	18
	3.	Lexical Analysis: <ul style="list-style-type: none">The role of the lexical analyserInput bufferingSpecification and recognition of tokensFinite AutomataConversion Regular Expression to an NFA – Thompson's ConstructionNFA to DFA – Subset ConstructionRegular expression to DFA	10	-	7	-	17	34

	4.	Syntac Analysis: <ul style="list-style-type: none"> • The role of parser • Context free grammar • Writing a grammar • Top - down parsing • Recursive decent parsing • Non-recursive predictive parsing • Error recovery mechanism • LL grammar • Bottom-up parsing – handles, • shift reduced parsing • LR parsers 	10	-	7	-	17	34
	5.	Semantic Analysis: <ul style="list-style-type: none"> • Syntax directed translation: <ul style="list-style-type: none"> – Syntax directed definitions, syntax tree construction, synthesized and inherited attributes, dependency graph, S-attributed definitions, L-attributed definition, top-down and bottom-up evaluation. • Type Checking: <ul style="list-style-type: none"> – Type system, Specification simple type checker, equivalence of typeexpression, Type 	7	-	5	-	12	24
	6.	Intermediate Code: <ul style="list-style-type: none"> • Intermediate languages • Three address code • Declarations • Assignment statement • Addressing array elements • Boolean expression • Case statements • Procedure calls • Back patching 	5	-	4	-	9	18

	7.	Code Generation and Optimizing: <ul style="list-style-type: none"> • Code generator design issues • Target machine • Runtime storage management • Basic blocks and flow graphs • Next use information • Simple code generator 	4	-	4	-	8	16
		Total	46	3	31	-	80	160
16.	Main references supporting the course: <ul style="list-style-type: none"> • Compiler Design simply in depth by Ajit Singh, 2020 • Introduction to Compiler Design by TorbenAegidiusMogensen, 2017 • A practical approach to compiler construction by Des Watson, 2017 • Introduction to Compiler Construction by Dr. Michael OlugbengaAgbaje, 2015 							

1	Name of Course/Module : ARTIFICIAL INTELLIGENCE					
2	Course Code: BIT 353					
3	Name(s) of academic staff:					
4	Rationale for the inclusion of the course /module in the programme: This course module impart knowledge on what Artificial Intelligence (AI) is, explore use cases and applications of AI, understand AI concepts and terms like machine learning, deep learning and neural networks.					
5	Semester and Year offered: year 3 semester 5					
6	Course Hours	Face to Face				ILT
		L	T	P	O	TSLT
	L=Lecture T=Tutorial P=Practical O=Others TSLT=Total student learning time	34	4	22	6	60
7	Credit Value: 3					
8	Prerequisite: Nil					
9	Course Learning Outcomes: On completion of this course students will be able to: <ul style="list-style-type: none"> Describe fundamental understanding of the history of artificial intelligence (AI) and its foundations. Analyse the basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning. Demonstrate proficiency in applying scientific method to models of machine learning. 					
10	Transferable Skills: <ul style="list-style-type: none"> Critical Thinking & Problem Solving Skills Information Management & Life Long Learning Evaluating results 					
11	Teaching –learning and assessment strategy <ul style="list-style-type: none"> Lectures Tutorials At the end of the programme, students are given an opportunity to evaluate the course and the lecturer.					
12	Synopsis: The main purpose of this course is to provide the most fundamental knowledge to the students so that they can understand the terminology of AI. This course helps Students to be exposed to various issues and concerns surrounding AI such as ethics and bias, & jobs, and get advice from experts about learning and starting a career in AI.					
13	Mode of Delivery: Lectures, Tutorials, Practical.					

14	Assessments Methods and Types: Assignments 20% Mid Exam 20% Final Exam 50% Quiz 10% Total 100%							
15	Content Outline of the course/module and the SLT per topic							
	No	Subject description	Face to face				ILT	Total
			Lecture	Tutorial	Practical	Others		
	1.	Introduction to ArtificialIntelligence: <ul style="list-style-type: none">• Introduction to AI• Why AI in today's tech world• Definition of AI• Characteristics of AI• Application of AI• Some Terminology of AI	3	2	-	-	5	10
	2.	Intelligent Agent: <ul style="list-style-type: none">• Introduction to Intelligent Agent• Properties of Agent• Sensor / Actuator / effectors and actions• Environments• Intelligent Agent example	4	2	-	-	6	12
3.	Problem Solving: <ul style="list-style-type: none">• Defining problems as a state space search• Problem formulation• Problem types, Well- defined problems, Constraint satisfaction problem• Game playing, Production systems	4	-	3	-	7	14	

	4.	Searching Techniques: <ul style="list-style-type: none"> Uninformed search techniques- depth first search, breadth first search, depth limit search, and search strategy comparison Informed search, best first search, greedy search, A* search Adversarial search techniques-minimax procedure, alpha beta procedure 	6	-	5	-	11	22
	5.	Knowledge Representation: <ul style="list-style-type: none"> Formal logic-connectives, truth tables, syntax, semantics, tautology Approaches to Knowledge Representation Propositional logic, predicate logic, FOPL, interpretation, quantification Backward chaining & Forward chaining Rules of inference, unification, resolution refutation system (RRS), answer extraction from RRS, rule based deduction system, 	7	-	6	-	13	26
	6.	Machine Learning: <ul style="list-style-type: none"> Concepts of learning Learning by analogy, Inductive learning, Explanation based learning Supervised and unsupervised learning algorithm Naïve Bayes and Decision Tree classifier K-Mean Cluttering algorithm Q-Learning for Learning policies 	5	-	4	-	9	18

	7.	Applications of Artificial Intelligence: <ul style="list-style-type: none"> Expert system (Architecture, Expert system development process), Neural Network (Mathematical model, gate realization, Network structure), natural language processing (Steps of NLP parsing) Basic concepts of Machine vision 	5	-	4	-	9	18
		Total	34	4	22	-	60	120

16.	Main references supporting the course: <ul style="list-style-type: none"> Russell and Norvig, Artificial Intelligence, A Modern Approach. 4th Edition. ISBN: 0134610997 / 3rd Edition. ISBN: 0136042597 							
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SEMESTER V

1	Name of Course/Module : SOFTWARE ENGINEERING						
2	Course Code: BIT 244						
3	Name(s) of academic staff:						
4	Rationale for the inclusion of the course /module in the programme:						
5	Semester and Year offered: year 2 semester 4						
6	Course Hours	Face to Face				ILT	TSLT
		L	T	P	O		
	L=Lecture T=Tutorial P=Practical O=Others TSLT=Total student learning time	40	10	32	6	82	170
7	Credit Value:4						
8	Prerequisite: Nil						
9	Course Learning Outcomes: On completion of this course students will be able to: <ul style="list-style-type: none"> Understand the principles of large scale software systems and the processes that are used to build them. Acquire skills to think about problems and their solutions using appropriate methods of analysis and design. Identify some of the main risks of software development and use. 						
10	Transferable Skills: <ul style="list-style-type: none"> Critical Thinking & Problem Solving Skills Information Management & Life Long Learning Evaluating results 						
11	Teaching –learning and assessment strategy <ul style="list-style-type: none"> Lectures Tutorials At the end of the programme, students are given an opportunity to evaluate the course and the lecturer.						
12	Synopsis: This course helps to study a body of knowledge relating to software engineering, software reengineering, and maintenance. It helps to investigate and improve the specification of a software system as well as use and evaluate appropriate tools and techniques.						
13	Mode of Delivery: Lectures, Tutorials, Practical.						

14	Assessments Methods and Types: Assignments 20% Mid Exam 20% Final Exam 50% Quiz 10% Total 100%							
15	Content Outline of the course/module and the SLT per topic							
	No	Subject description	Face to face				ILT	Total
			Lecture	Tutorial	Practical	Others		
	1.	Introduction to software engineering: <ul style="list-style-type: none">• Basic concepts• Software engineering principles• Software characteristics• Applications• Objectives of software engineering• Phases of software engineering	4	3	-	-	7	14
	2.	Software process and Life Cycle models: <ul style="list-style-type: none">• Software process• Project and product• Process assessment• Software Process capability maturity model: CMM Model• Life cycle models: Waterfall model, Incremental model, spiral model, advantages and disadvantages	4	-	3	-	7	14
	3.	Software life cycles Models -2: <ul style="list-style-type: none">• Prototyping Model,• Object-oriented model,• Agile model,• Extreme programming (Latest models can be discussed), advantages and disadvantages	4	-	2	-	6	12
4.	Software requirements: <ul style="list-style-type: none">• Functional- non-functional requirements• User requirement• System requirements• Software requirements documentation	4	-	2	-	6	12	

	5.	Software Requirement engineering process: <ul style="list-style-type: none"> • Feasibility studies • Requirements elicitation and analysis • Requirement validation • Software prototyping • Requirement management 	6	-	2	-	8	16
	6.	Software Reliability: <ul style="list-style-type: none"> • Software Reliability • Software Reliability Metrics • Programming for Reliability • Software Reuse 	5	-	2	-	7	14
	7.	Software design: <ul style="list-style-type: none"> • Basics of software design • Data design • Architectural design • Component level design and user interface design • Fundamental design concepts-module and modularization • Design techniques 	5	-	2	-	7	14
	8.	Object oriented design: <ul style="list-style-type: none"> • Objects and object classes • Relationship: An Object Oriented design process • Object identification • Design model (sequence model, state diagram) 	4	-	2	-	6	12
	9.	Software Implementation: <ul style="list-style-type: none"> • Implementation: <ul style="list-style-type: none"> – Structures coding technique – Coding styles – Coding methodology – Coding verification techniques – Coding tools – Code documentation – Standards and guidelines 	2	-	2	-	4	8

	10.	Software maintenance: <ul style="list-style-type: none"> • Software re-engineering • Change management • Configuration management • Maintenance tools and techniques 	2	-	2	-	4	8
	11.	Software testing strategies: <ul style="list-style-type: none"> • A strategic approach to software testing • Test strategies for convention software • Black-box and white box testing • Validation and system testing and debugging 	3	-	2	-	5	10
	12.	Software metrics: <ul style="list-style-type: none"> • Software quality metrics • Metrics for analysis models • Metrics for design model • Metrics for source code • Metrics for testing • Metrics for maintenance 	3	-	2	-	5	10
	13.	Quality Management: <ul style="list-style-type: none"> • Quality Management • Quality concepts • Software quality assurance • Software reviews • Formal Technical reviews • The ISO 9000 quality standards 	3	-	2	-	5	10
	14.	Software project management: <ul style="list-style-type: none"> • Project planning • Project scheduling • Project staffing • People capability maturity model 	2	-	2	-	4	8
		Total	50	3	27	-	80	160
16.	Main references supporting the course: <ul style="list-style-type: none"> • Software Engineering, A Practitioner's Approach Roger S. Pressman, 6th edition. McGraw Hill International edition • Software Engineering, Sommerville, 7th edition, Pearson education, 2004 							

1	Name of Course/Module : CYBER SECURITY LAW AND POLICY						
2	Course Code: CSLPA 232						
3	Name(s) of academic staff:						
4	Rationale for the inclusion of the course /module in the programme: This course helps to examine legal and policy challenges stemming from rapidly evolving cyber security threats.						
5	Semester and Year offered: year 2 semester 4						
6	Course Hours	Face to Face				ILT	TSLT
		L	T	P	O		
	L=Lecture T=Tutorial P=Practical O=Others TSLT=Total student learning time	55	25	-	6	80	166
7	Credit Value:4						
8	Prerequisite: Nil						
9	Course Learning Outcomes: On completion of this course students will be able to: <ul style="list-style-type: none">• Develop skills in cyber security, networks and their management.• Gain technical expertise of cyber threat intelligence, risk management and industry standards relating to cyber security.• Uplift the professional skills necessary for a career in the IT industry.						
10	Transferable Skills: <ul style="list-style-type: none">• Critical Thinking & Problem Solving Skills• Information Management & Life Long Learning• Ethics, Moral and Professionalism• Leadership Skills						
11	Teaching –learning and assessment strategy <ul style="list-style-type: none">• Lectures• Tutorials At the end of the programme, students are given an opportunity to evaluate the course and the lecturer.						
12	Synopsis: This course module explores the national and international legal frameworks that govern malicious and defensive actions in cyberspace, including laws related to cybercrime, cyberespionage, and cyberwar.						
13	Mode of Delivery: Lectures, Tutorials, practical.						

14	Assessments Methods and Types: Assignments 20% Mid Exam 20% Final Exam 50% Quiz 10% Total 100%							
15	Content Outline of the course/module and the SLT per topic							
	No	Subject description	Face to face				ILT	Total
			Lecture	Tutorial	Practical	Others		
	1.	History of Development was for Use by Already Trusted Identities: <ul style="list-style-type: none">• Packets• TCP/IP• Network of networks• Control points• Lack of central authority (including ownership and governance)• Generative• Outsourced• Mostly all 3rd party• Cloud- More than the Internet	8	3	-	-	11	22
	2.	Vulnerabilities: <ul style="list-style-type: none">• Computer Network Attack (malicious code)• Distributed Denial of Service (DDOS)• Espionage / exploitation• Integrity degradation of data in transit• Integrity degradation of stored data• Destruction• Warfare complement• Recruiting/fund raising (cyber facilitated terrorism distinguished from attacks on information infrastructure)• Supply chain• Enemy operational communications	9	3	-	-	12	24

	3.	Threats: <ul style="list-style-type: none"> Nation states and their militaries and agents Non -state actors “patriotic hackers” Criminals (some organized) Terrorists (some working with criminals) Insiders 	5	2	-	-	7	14
	4.	WCS Categories: <ul style="list-style-type: none"> Networking Computers Blurred the Boundaries Between Cyber Warfare, Cybercrime Cyber Terrorism Cyber Attack and more 	2	2	-	-	4	8
	5.	Existing Law: <ul style="list-style-type: none"> Law of armed conflict Proportionality Discrimination Necessity Humanity Council of Europe Convention on Cyber Crime Is access a human right? 	4	2	-	-	6	12
	6.	Case Study Position in American Bar Association (ABA): <ul style="list-style-type: none"> Report Position in National Academy of Sciences (NAS) Report Position of 7/14/11 Strategy for Cyberspace Apply to real world scenarios Georgia Estonia dissidents 	3	2	-	-	5	10
	7.	Elements of the definition of “armed attack” and of “use of force” in cyberspace: <ul style="list-style-type: none"> Effects What Kind Intent Hack-backs 	2	2	-	-	4	8

	8.	Methods (or “Implementation Mechanisms”): <ul style="list-style-type: none"> • Regulation • Criminal Law • Civil Law • Monetary Incentives • Education • Leadership/Best Practices • Military Force 	5	2	-	-	7	14
	9.	Case Study-United States v. Morris: <ul style="list-style-type: none"> • Computer Fraud & Abuse Act • Electronic Communications Privacy Act • Trade Secrets / espionage act • Material Support • Proposed warrants for foreign searches • (hacking warrants) • Effective preemption of state crimes • Current state of Commerce Clause as basis for jurisdiction • Hacker arrests in summer of 2011 	8	3	-	-	11	22
	10.	Case Study : U.S. Attempts to Use Civil Law to Affect Conduct in Cyberspace: <ul style="list-style-type: none"> • Professor Lisa Dolak has Offered to Join us for this Session • Tort Law <ul style="list-style-type: none"> – Data Theft – Failure to Protect • Data Theft Disclosure Laws • Standards Set by Administrative Regulations • Intellectual Property Law 	5	2	-	-	7	14

	11.	The Role of Private Sector in Securing Cyber Space Cyber Policy Review: <ul style="list-style-type: none"> White House International Cyber Strategy for Operating in Cyberspace Review NSTIC Walls Stovepipes Partnerships “multi-stakeholderism” 	4	2	-	-	6	12
		Total	55	25	-	-	80	160
16.	Main references supporting the course: <ul style="list-style-type: none"> Javier, L., Roberto, S., & Stephen, W. (2012). Critical Infrastructure Protection: Advances in Critical Infrastructure Protection: Information Infrastructure Models, Analysis, and Defense. Springer-Verlag Berlin Heidelberg Additional References Supporting the Course: <ul style="list-style-type: none"> John, R. V. (2013). Managing Information Security. Syngress 							

1	Name of Course/Module : CRYPTOGRAPHY						
2	Course Code: MWCM-351						
3	Name(s) of academic staff:						
4	Rationale for the inclusion of the course /module in the programme: This course provides an introduction to modern cryptography and communication security. It focuses on how cryptographic algorithms and protocols work and how to use them.						
5	Semester and Year offered: year 3 semester 5						
6	Course Hours	Face to Face				ILT	TSLT
		L	T	P	O		
	L=Lecture T=Tutorial P=Practical O=Others TSLT=Total student learning time	51	13	17	6	81	168
7	Credit Value:4						
8	Prerequisite: Nil						
9	Course Learning Outcomes: On completion of this course students will be able to: <ul style="list-style-type: none">Understand basic principles of cryptography and general cryptanalysis.Compose, build and analyze simple cryptographic solutions in a professional manner.Acquaint with the concepts of symmetric encryption and authentication.						
10	Transferable Skills: <ul style="list-style-type: none">Critical Thinking & Problem Solving SkillsInformation Management & Life Long LearningEthics, moral and professionalism						
11	Teaching –learning and assessment strategy <ul style="list-style-type: none">LecturesTutorials At the end of the programme, students are given an opportunity to evaluate the course and the lecturer.						
12	Synopsis: The course objective is to familiarize basic concepts of cryptography so as the students can use their understanding for information security purpose.The course covers the concepts of block ciphers and message authentication codes, public key encryption, digital signatures and key establishment.						
13	Mode of Delivery: Lectures, Tutorials, Practical.						
14	Assessments Methods and Types: Assignments 20% Mid Exam 20% Final Exam 50% Quiz 10% Total 100%						

15

Content Outline of the course/module and the SLT per topic							
No	Subject description	Face to face				ILT	Total
		Lecture	Tutorial	Practical	Others		
1.	Introduction to Cryptography: <ul style="list-style-type: none">Computer Security, Information Security, Cybersecurity, Network SecurityCIA TraidIntroduction to Cryptography, Cryptosystem, CryptanalysisSecurity Services and Mechanisms	5	2	-	-	7	14
2.	Classical Encryption Techniques: <ul style="list-style-type: none">Classical Cryptosystems, Introduction to Substitution and Transposition techniquesCaesar Cipher, Monoalphabetic ciphersPolyalphabetic Ciphers, Playfair Cipher, Hill Cipher, Vigenere Cipher, Verman Cipher, One-time pad, Rail Fence cipher	4	-	4	-	8	16
3.	Block Ciphers and the Data Encryption Standard: <ul style="list-style-type: none">Modern Ciphers, Stream Cipher, Block CipherData Encryption Standard (DES), Double DES, Triple DES	3	1	-	-	4	8
4.	Advanced Encryption Standard: <ul style="list-style-type: none">Introduction, Structure of AESEncryption Process, Round Functions, Decryption Process	3	1	-	-	4	8
5.	More on Symmetric Ciphers: <ul style="list-style-type: none">International Data Encryption Standard (IDEA)Blowfish Algorithm	3	1	-	-	4	8

	6.	Confidentiality Using Symmetric Encryption: <ul style="list-style-type: none"> Potential Locations for Confidentiality attack, Approaches for encryption: Link encryption & End-to-end encryption, Traffic analysis Placement of Encryption based approach, Key Distribution scenario and issues Random numbers and Pseudorandom number generators 	3	2	-	-	5	10
	7.	Public Key Cryptography and RSA: <ul style="list-style-type: none"> Introduction to public key cryptosystems, Encryption and Decryption process, Applications Distribution of Public key, Man-in-the-middle attack RSA algorithm with example 	5	-	3	-	8	14
	8.	Key Management, other Public Key Cryptosystems: <ul style="list-style-type: none"> Key generation scheme Key distribution scheme, Diffie-Hellman Key Exchange Elgamal Cryptographic system 	3	-	2	-	5	10
	9.	Message Authentication and Hash Functions: <ul style="list-style-type: none"> Message Authentication, Message Authentication Functions, Message Authentication Codes Hash Functions, Properties and Applications 	4	-	3	-	7	14
	10.	Hash and MAC Algorithms: <ul style="list-style-type: none"> Message Digests: MD4 and MD5 Secure Hash Algorithms: SHA-1, SHA-2 	2	-	2	-	4	8

	11.	Digital Signatures and Authentication Protocol: <ul style="list-style-type: none"> Digital Signatures: Direct and Arbitrated digital signature Digital Signature Standard: The DSS approach, The RSA approach Authentication System, Password Based Authentication, Challenge Handshake authentication protocol, Extensible Authentication protocol, Kerberos 	5	2	-	-	7	14
	12.	Authentication Applications: <ul style="list-style-type: none"> Authentication Factors Authentication Types Authorization, Access Control 	3	2	-	-	5	10
	13.	Electronic Mail Security, IP Security, Web Security: <ul style="list-style-type: none"> Web Security, Threats, Overview of SSL and TLS, Overview of HTTPS Secure Electronic Transaction Overview, Dual Signature, Payment Processing E-Mail, SMTP, PEM, PGP, Concept of Secure Email 	4	-	3	-	7	14
	14.	Intruders, Malicious Software, Firewalls: <ul style="list-style-type: none"> Malicious Logic: Virus, Worm, Trojan Horse, Denial of Service attacks Intrusion, Intruders and their types, Intrusion detection system Firewall and its types 	4	2	-	-	6	10
		Total	51	13	17	-	81	162
16.	Main references supporting the course: <ul style="list-style-type: none"> Applied Cryptography: Protocols, Algorithms, and Source Code in C 2nd Edition by Bruce Schneier 							

1	Name of Course/Module : MULTIMEDIA SYSTEM						
2	Course Code: BIT 364						
3	Name(s) of academic staff:						
4	Rationale for the inclusion of the course /module in the programme: In this course, students will be introduced to principles and current technologies of multimedia systems. Issues in effectively representing, processing and retrieving multimedia data such as sound and music, graphics, image and video will be addressed.						
5	Semester and Year offered: year 2 semester 4						
6	Course Hours	Face to Face				ILT	TSLT
		L	T	P	O		
	L=Lecture T=Tutorial P=Practical O=Others TSLT=Total student learning time	41	2	38	6	81	168
7	Credit Value:4						
8	Prerequisite: Nil						
9	Course Learning Outcomes: On completion of this course students will be able to: <ul style="list-style-type: none">Analyse and synthesise the key components of multimedia technologies including text, graphics, voice, video and animation.Evaluate the role of multimedia technologies in the online and web environment so as to minimize the risk.Research and analyse the protocols, standards and representation techniques used for storage and transmission of multimedia information useful for future learning.						
10	Transferable Skills: <ul style="list-style-type: none">Critical Thinking & Problem Solving SkillsInformation Management & Life Long LearningEvaluating results						
11	Teaching –learning and assessment strategy <ul style="list-style-type: none">LecturesTutorials At the end of the programme, students are given an opportunity to evaluate the course and the lecturer.						
12	Synopsis: The main focus of this course is to make the students acquainted with the fundamental concepts of multimedia and multimedia systems in emerging multimedia value added services.It includes multimedia skills, text, sound, animation and videos.						
13	Mode of Delivery: Lectures, Tutorials, Practical						

14	Assessments Methods and Types: Assignments 20% Mid Exam 20% Final Exam 50% Quiz 10% Total 100%							
15	Content Outline of the course/module and the SLT per topic							
	No	Subject description	Face to face				ILT	Total
			Lecture	Tutorial	Practical	Others		
	1.	Introduction: <ul style="list-style-type: none">Basic multimedia terms such as: multimedia, integration, interactive, hypermedia, HTMLAuthoring and qualify various characteristics of multimedia<ul style="list-style-type: none">nonlinear versus linear contentApplications of Multimedia<ul style="list-style-type: none">Multimedia in BusinessMultimedia in SchoolsMultimedia at HomeVirtual Reality	5	2	-	-	7	14
2.	Multimedia Skills: <ul style="list-style-type: none">Typical members of a multimedia project teamSkills that they need for their work<ul style="list-style-type: none">Project Manager, Creative Director/Multimedia Designer, Art Director/Visual Designer, Artist, Interface Designer, Game Designe, Subject Matter Expert, Instructional Designer/Training Specialist, Scriptwriter, Anamitor(2-D/3-D), Music composer, Multimedia Programmer, HTML coder, Lawer/Media Acquistion, Marketing Director	6	-	6	-	12	24	

	3.	Text: <ul style="list-style-type: none"> • Importance of word choice • Difference between a typeface and a font • Presentation of text 	2	-	2	-	4	8
	4.	Sound: <ul style="list-style-type: none"> • What is sound? • Digital Audio • Editing Digital Recordings • File size vs Quality • MIDI Audio • Audio File Formats • Adding sound to the multimedia project 	3	-	3	-	6	12
	5.	Images: <ul style="list-style-type: none"> • Bitmap and Vector images • 2D and 3D images • Use of colors and palettes in Multimedia • Image file types used in multimedia 	2	-	2	-	4	8
	6.	Animation: <ul style="list-style-type: none"> • Basic concepts of animation • Computer Animations • Animation Techniques • Animation File formats 	2	-	2	-	4	8
	7.	Video: <ul style="list-style-type: none"> • Digital Video • Screen Resolutions for computer monitors • Video containers and codecs • Shooting and Editing Video • Video Editing 	2	-	3	-	5	10
	8.	Hardware: <ul style="list-style-type: none"> • Computer platforms <ul style="list-style-type: none"> – Windows Vs Macintosh – Connecting Devices – Memory and storage devices – Input and output devices 	2	-	2	-	4	8

	9.	Basic Software Tools: <ul style="list-style-type: none"> Text Editing and Word processing tools OCR Software Painting and Drawing Tools Image-editing software Sound- Editing tools 3-D Modeling and Animation tools Animation, Video, and Digital Movie Tools Format converters 	5	-	5	-	10	20
	10.	Multimedia Authoring Tools: <ul style="list-style-type: none"> Need of authoring tools Types of Authoring tools Choosing an Authoring Tool 	2	-	2	-	4	8
	11.	Designing for World Wide Web: <ul style="list-style-type: none"> Basic methods for displaying elements of multimedia on a web page Text, Image, Audio, Animation and Video for the Web 	2	-	3	-	5	10
	12.	Planning and Costing: <ul style="list-style-type: none"> The Process of Making Multimedia Scheduling, Estimating, Writing a multimedia project proposal 	3	-	3	-	6	12
	13.	Designing and Producing: <ul style="list-style-type: none"> Designing: Designing the structure, Designing the user Interface Producing: Starting Up, Working with Clients, Tracking, Copyrights 	3	-	3	-	6	12
	14.	Content, Talent and Delivering: <ul style="list-style-type: none"> Acquiring Content Acquiring Talent Delivering 	2	-	2	-	4	8
		Total	41	2	38	-	81	162

16.	<p>Main references supporting the course:</p> <ul style="list-style-type: none"> • Multimedia systems by Buford Pearson Education • Multimedia Systems Design by Thakrar K • "Multimedia Systems" by Ralf Steinmetz and KlaraNahrstedt • "Multimedia Communications: Directions and Innovations" by J D Gibson • Multimedia systems design by prabhat K. Andleigh/ KiranThakrar
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1	Name of Course/Module : LEADERSHIP AND HUMAN RELATIONS					
2	Course Code: BIT 122					
3	Name(s) of academic staff:					
4	Rationale for the inclusion of the course /module in the programme: This course is designed to provide knowledge on the relationship between behavior, human relations, and organizational performance.					
5	Semester and Year offered: year 2 semester 3					
6	Course Hours	Face to Face				
		L	T	P	O	ILT
	L=Lecture T=Tutorial P=Practical O=Others TSLT=Total student learning time	28	12	-	6	40
7	Credit Value: 2					
8	Prerequisite: Nil					
9	Course Learning Outcomes: On completion of this course students will be able to: <ul style="list-style-type: none"> Describe the relationship between performance at the individual and group levels and organizational performance. State how power, politics, and ethics affect behavior, human relations, and performance. Identify steps of initiating, responding to, and mediating conflict resolutions and decision making. 					
10	Transferable Skills: <ul style="list-style-type: none"> Critical Thinking & Problem Solving Skills Information Management & Life Long Learning Leadership Skills Ethics, Moral and Professionalism 					
11	Teaching –learning and assessment strategy <ul style="list-style-type: none"> Lectures Tutorials At the end of the programme, students are given an opportunity to evaluate the course and the lecturer.					
12	Synopsis: This course modules offers understanding on models and theories of leadership. It helps to provide personal strategies for improving human relations. This course main focus is to build up the career that begins with knowing yourself.					
13	Mode of Delivery: Lectures, Tutorials.					

14	Assessments Methods and Types: Assignments 20% Mid Exam 20% Final Exam 50% Quiz 10% Total 100%							
15	Content Outline of the course/module and the SLT per topic							
	No	Subject description	Face to face				ILT	Total
			Lecture	Tutorial	Practical	Others		
	1.	Introduction: <ul style="list-style-type: none">• Meaning of Leadership and Human Relations• Models and Theories of Leadership• Management and Leadership• Know Yourself; to Make Your Career Success• Personal Strategies for Improving Human Relations• Special Challenges in Human Relations	6	2	-	-	8	16
	2.	Leadership Skills and Human Relations: <ul style="list-style-type: none">• Models and Theories of Leadership• Leadership Styles• Factors that determine leadership style• Theories of Leadership• The Functional/ Behavioral Theories of Leadership• Contingency/Situational Theories of Leadership	6	2	-	-	8	16
3.	Models and Leadership: <ul style="list-style-type: none">• Leadership Qualities• Management Vs Leadership	2	2	-	-	4	8	

16.	4.	Career Success Begins with Knowing Yourself: <ul style="list-style-type: none"> • Leaders are the persons who; • Self-Awareness • Understanding Your Communication Style • Determinants of Your Communication Styles • Building High Self Esteem • Personal Value Influence 	4	2	-	-	6	12
	5.	Personal Strategies for Improving Human Relations: <ul style="list-style-type: none"> • Improving Interpersonal Relations with Constructive Self-Disclosure • Foundation of Self-Disclosure in Organization • Benefits of Self-Disclosure • Johari Windows: A Model for Self Understanding • Achieving Emotional Balance in a Chaotic World 	6	2	-	-	8	16
	6.	Special Challenges in Human Relations: <ul style="list-style-type: none"> • Responding to Personal Work-Related Stress • Stress Management Strategies • Valuing Workforce Diversity • The Changing Role of Men and Women 	4	2	-	-	6	12
		Total	28	12	-	-	40	80
16. Main references supporting the course: <ul style="list-style-type: none"> • Armstrong, M. (2009) Armstrong's handbook of human resource management (11th edition). London: Kogan Page. 								

SEMESTER VI

RESEARCH METHODOLOGY

UNIT I –RESEARCH FORMULATION AND DESIGN

Motivation and objectives – Research methods vs. Methodology. Types of research – Descriptive vs. Analytical, applied vs. Fundamental, Quantitative vs. Qualitative, Conceptual vs. Empirical, concept of applied and basic research process, criteria of good research. Defining and formulating the research problem, selecting the problem, necessity of defining the problem, importance of literature review in defining a problem, literature review-primary and secondary sources, reviews, monograph, patents, research databases, web as a source, searching the web, critical literature review, identifying gap areas from literature and research database, development of working hypothesis.

UNIT II – DATA COLLECTION AND ANALYSIS

Accepts of method validation, observation and collection of data, methods of data collection, sampling methods, data processing and analysis strategies and tools, data analysis with statically package (Sigma STAT, SPSS for student t-test, ANOVA, etc.), hypothesis testing.

UNIT III – SOFT COMPUTING

Computer and its role in research, Use of statistical software SPSS, GRETL etcin research. Introduction to evolutionary algorithms - Fundamentals of Genetic algorithms, Simulated Annealing, Neural Network based optimization, Optimization of fuzzy systems.

UNIT IV –RESEARCH ETHICS, IPR AND SCHOLARY PUBLISHING

Ethics-ethical issues, ethical committees (human & animal); IPR- intellectual property rights and patent law, commercialization, copy right, royalty, trade related aspects of intellectual property rights (TRIPS); scholarly publishing- IMRAD concept and design of research paper, citation and acknowledgement, plagiarism, reproducibility and accountability.

UNIT V –INTERPRETATION AND REPORT WRITING

Meaning of Interpretation, Technique of Interpretation, Precaution in Interpretation, Significance of Report Writing, Different Steps in Writing Report, Layout of the Research Report, Types of Reports, Oral Presentation, Mechanics of Writing a Research Report, Precautions for Writing Research Reports, Conclusions.

REFERENCES

1. Garg, B.L., Karadia, R., Agarwal, F. and Agarwal, U.K., 2002. An introduction to Research Methodology, RBSA Publishers.
2. Kothari, C.R., 1990. Research Methodology: Methods and Techniques. New Age International. 418p.
3. Sinha, S.C. and Dhiman, A.K., 2002. Research Methodology, Ess Ess Publications. 2 volumes.
4. Trochim, W.M.K., 2005. Research Methods: the concise knowledge base, Atomic Dog Publishing. 270p.
5. Wadehra, B.L. 2000. Law relating to patents, trademarks, copyright designs and geographical indications. Universal Law Publishing.

VALUES & ETHICS IN PROFESSION

UNIT 1: Introduction to Professional Ethics

- Basic Concepts of Professional ethics
- Governing Ethics
- Personal and professional ethics
- Ethical dilemmas
- Life skills
- Emotional Intelligence
- Thought of Ethics
- Value Education
- Dimensions of Ethics
- Profession and Professionalism
- Professional Associations
- Professional Success
- Ethics and Profession

UNIT 2: Basic Theories

- Basic Ethical Principles
- Moral Developments
- Deontology
- Utilitarianism
- Virtual Theory
- Rights Theory
- Casuist Theory
- Moral Absolution
- Moral Rationalism
- Moral Pluralism
- Ethical Egoism
- Feminist Consequentialism
- Moral Issues
- Moral Dilemmas
- Moral Autonomy

UNIT 3: Work Place Rights & Responsibilities

- Ethics in changing domains of research
- Engineers and Managers
- Organizational Complaint procedure
- Difference of professional Judgment within the Nuclear Regulatory Commission (NRC)
- Ethics in Changing domains of research
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UNIT 4: Global Issues in Professional Ethics:

- Introduction to current Scenario
- Technology Globalization
- International Trade
- World Summits
- Business Ethics and Corporate Governance
- Sustainability Development Ecosystem
- Ethics in Manufacturing and Marketing
- Media Ethics
- War Ethics
- Intellectual Property Rights

UNIT 5: Business Ethics

- Relevance of values in Management
- Holistic approach for managers in decision making
- Ethical Management role of organizational culture in ethics
- Structure of ethics management
- Ethics committee
- Ethical culture and values in corporate

References

- Bashe, A., Anderson, S. K., Handelsman, M. M., & Klevansky, R. (2007). An Acculturation Model for Ethics Training: The Ethics Autobiography and Beyond. *Professional Psychology: Research and Practice*, 38(1), 60-67.
- Birden, H., Glass, N., Wilson, I., Harrison, M., Usherwood, T., & Nass, D. (2013). Teaching professionalism in medical education: A Best Evidence Medical Education (BEME) systematic review. BEME Guide No. 25. *Med Teach*, 35(7), e1252-e1266. <https://doi.org/10.3109/0142159X.2013.789132>
- Cruess, S. R., & Cruess, R. L. (2012). Teaching professionalism - Why, What and How. Facts, views & vision in *ObGyn*, 4(4), 259–265. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3987476/>
- Keaton, A. F. (2017, November 17). *Teaching Students the Importance of Professionalism*. Faculty Focus. <https://www.facultyfocus.com/articles/effective-classroom-management/teaching-students-importance-professionalism/>

1	Name of Course/Module : MOBILE COMPUTING						
2	Course Code: BIT 351						
3	Name(s) of academic staff:						
4	Rationale for the inclusion of the course /module in the programme: This course provides understanding on mobile computing with its application. It also provides in depth learning on cellular systems and mobility management as well.						
5	Semester and Year offered: year 2 semester 4						
6	Course Hours	Face to Face				ILT	TSLT
		L	T	P	O		
	L=Lecture T=Tutorial P=Practical O=Others TSLT=Total student learning time	51	12	17	6	80	166
7	Credit Value:4						
8	Prerequisite: Nil						
9	Course Learning Outcomes: On completion of this course students will be able to: <ul style="list-style-type: none"> Discuss the principles and theories of mobile computing technologies. Analyse the possible future of mobile computing technologies and applications for lifelong learning process. Identify the course work through written and oral presentations. 						
10	Transferable Skills: <ul style="list-style-type: none"> Critical Thinking & Problem Solving Skills Information Management & Life Long Learning Communication Skills 						
11	Teaching –learning and assessment strategy <ul style="list-style-type: none"> Lectures Tutorials At the end of the programme, students are given an opportunity to evaluate the course and the lecturer.						
12	Synopsis: The course module enables a critical understanding of mobile computing from different viewpoints: infrastructures, principles and theories, technologies, and applications in different domains. It covers the topics like: mobile telecommunication system, mobile network layer, mobile transport and application layer.						
13	Mode of Delivery: Lectures, Tutorials, Practical.						

14	Assessments Methods and Types: Assignments 20% Mid Exam 20% Final Exam 50% Quiz 10% Total 100%							
15	Content Outline of the course/module and the SLT per topic							
	No	Subject description	Face to face				ILT	Total
			Lecture	Tutorial	Practical	Others		
	1.	Introduction: <ul style="list-style-type: none">• Introduction to Mobile Computing• Application of Mobile Computing• Generations of Mobile Communication Technologies• Multiplexing• Spread Spectrum• MAC Protocols• SDMA-TDMA-FDMA-CDMA	10	4	-	-	14	28
	2.	Mobile Telecommunication System: <ul style="list-style-type: none">• Introduction to Cellular Systems• GSM-Services & Architecture• GSM<ul style="list-style-type: none">– Protocols– Connection Establishment– Frequency Allocation– Routing– Mobility Management– Security• GPRS• UMTS – Architecture• Handover• Security	12	4	-	-	16	32

	3.	Mobile Network Layer: <ul style="list-style-type: none"> • Mobile IP, DHCP, AdHoc-Proactive Protocol-DSDV • Reactive Routing Protocols-DSR, AODV • Hybrid Routing-ZRP, Multicast Routing- ODMRP • Vehicular Ad Hoc Networks (VANET) – MANET Vs VANET-Security • IP Address, Router and AdHoc Configuration 	8	-	8	-	16	32
	4.	Mobile Transport and Application Layer: <ul style="list-style-type: none"> • Mobile TCP • WAP-Architecture • WDP,WTLS, WTP,WSP,WAE • WTA Architecutre • WML • AP, AP-Controller, Wifi Configuration 	9	-	9	-	18	36
	5.	Mobile Platforms and Applications: <ul style="list-style-type: none"> • Mobile Device Operating Systems • Special Constraints & Requirements • Commercial Mobile Operating Systems • Software Development Kit: iOS, Android, Blackberry, Windows Phone • M Commerce • Structure • Pros & Cons • Mobile Payment System • Security Issues 	12	4	-	-	16	32
		Total	51	12	17	-	80	160

16.	<p>Main references supporting the course:</p> <ul style="list-style-type: none"> • Understanding user experience of mobile video: Framework, measurement and optimization by Wei Song, Dian Tjondronegoro and Michael Docherty • Review of optimization problems in Wireless sensor networks by Ada Gogu, Dritan Nace, Arta Dilo and Nirvana Meratnia • Mobile Services Meet Distributed Cloud: benefits, Applications and Challenges by Tien-Dung Nguyen, Yunkon Kim, Xuan-Quy pham, Tri D.T. Nguyen and Eui-Nam Huh • Adaptive Security Framework in Internet of Things (IoT) for providing Mobile Cloud Computing by Feda Aishahwan
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1	Name of Course/Module : SOFTWARE PROJECT MANAGEMENT						
2	Course Code: BIT 362						
3	Name(s) of academic staff:						
4	Rationale for the inclusion of the course /module in the programme:						
5	Semester and Year offered: year 3 semester 5						
6	Course Hours	Face to Face				ILT	TSLT
		L	T	P	O		
	L=Lecture T=Tutorial P=Practical O=Others TSLT=Total student learning time	40	2	38	6	80	166
7	Credit Value:4						
8	Prerequisite: Nil						
9	Course Learning Outcomes: On completion of this course students will be able to: <ul style="list-style-type: none">Identify the different project contexts and suggest an appropriate management strategy.Practice the role of professional ethics in successful software development.Identify and describe the key phases of project management as per learning for life long process.						
10	Transferable Skills: <ul style="list-style-type: none">Ethics, Moral and ProfessionalismInformation Management & Life Long LearningEvaluating results						
11	Teaching –learning and assessment strategy <ul style="list-style-type: none">LecturesTutorials At the end of the programme, students are given an opportunity to evaluate the course and the lecturer.						
12	Synopsis: This course module is aimed at introducing the primary important concepts of project management related to managing software development projects. It also helps to determine an appropriate project management approach through an evaluation of the business context and scope of the project.						
13	Mode of Delivery: Lectures, Tutorials, Practical.						

14	Assessments Methods and Types: Assignments 20% Mid Exam 20% Final Exam 50% Quiz 10% Total 100%							
15	Content Outline of the course/module and the SLT per topic							
	No	Subject description	Face to face				ILT	Total
			Lecture	Tutorial	Practical	Others		
	1.	Introduction	4	2	-	-	6	12
	2.	Project Planning: <ul style="list-style-type: none">• Subdivision of the work• Qualification of the work• Using modern project to create a WBS• Entering WBS Information• The WBS listing report• Entering task data• The task budget listing report• Sequencing the work	7	-	7	-	14	28
	3.	Project Monitoring: <ul style="list-style-type: none">• Collecting actual expenditures• Cost reports• Project tracking• Progress and status reports• Scientific forecasting	4	-	5	-	9	18
	4.	Project Performance Evaluated: <ul style="list-style-type: none">• Variance analysis• Cost variances• Schedule variances• Variance reporting	3	-	3	-	6	12
	5.	Productivity Measurement: <ul style="list-style-type: none">• Unit Rates• The productivity ratio• The importance of productivity measurement	3	-	3	-	6	12

	6.	Alternate Views: <ul style="list-style-type: none"> Expanding the task list The expanded cost accounts The expanded transaction lists Expanded budget and cost reports The organizational breakdown structure (OBS) Building alternate hierarchies Exporting alternate hierarchies into the project database Hierarchy maintenance 	7	-	8	-	15	30
	7.	Interfacing Scheduling Systems: <ul style="list-style-type: none"> Task sequencing with Microsoft project Task-Naming convention Task Sequencing Resource Scheduling The critical path 	3	-	3	-	6	12
	8.	Government Projects: <ul style="list-style-type: none"> Historical perspective Government project management models Government project management vocabulary The meaning of WBS 	3	-	3	-	6	12
	9.	Risk Management: <ul style="list-style-type: none"> Qualification of Risk Contingency Draw – Down Stat using Contingency packages Risk Management Summary 	3	-	3	-	6	12
	10.	Resuing a Failing Project: <ul style="list-style-type: none"> Determining what went wrong Project definition Translating a definition into a plan Replanning 	3	-	3	-	6	12
		Total	40	2	38	-	80	160

16.	<p>Main references supporting the course:</p> <ul style="list-style-type: none"> • Boehm, B. Software Engineering Economics, Prentice-Hall, Englewood Cliffs, N.J., 1981. • Burgess, A. R., and J. B. Killebrew. "Variations in Activity Level on a Cyclical Arrow Diagram," • Journal of Industrial Engineering, Vol. 13, No. 2, March-April 1962. • Galbreath, R. V "Computer Program for Leveling Resource Usage," Journal of Construction Division, proceedings ASCE, Vol. 91, No. CO1, May 1965. • Howes, N. R. "Project Management Systems," Journal of Information and Management, Vol. 5, No. 6, pp. 243–268, 1982. <p>Additional references supporting the course:</p> <ul style="list-style-type: none"> • Howes, N. R. "Managing Software Development Projects for Maximum Productivity," IEEE • Transactions on Software Engineering, Vol. SE-10, pp. 27–35, January 1984. • Howes, N. R. "On Using the User's Manual as the Requirement Specification," in Software • Engineering Project Management, R. Thayer (Ed.), IEEE Computer Society Press, pp. 172–177, January 1988.
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SEMESTER VII

MANAGEMENT INFORMATION SYSTEM

Unit 1: Information Systems in Global Business Today

Opening Case: The New Yankee Stadium Looks to the Future

The Role of Information Systems in Business Today, New in management information system, Globalization Challenges and Opportunities. A Flattened World

The Emerging Digital Firm, Strategic Business Objectives of Information Systems Dimensions of Information Systems

Interactive Session: Technology UPS competes Globally with information Technology

A business Perspective on Information Systems; complementary assets: Organizational capital and the eright business model

Hands-on MIS projects

Management Decision Problems; Improvinig Decision Making; Using Databases to analyze Sales Trends;

Case Study: What's the Buzz on Smart Grids?

Unit 2 : Global e-business and Collaboration

Opening Case: America's Cup 2010: USA wins with information technology

Business Processes and Information Systems; business processes; Business improvement with information technology

Types of Business information systems; systems for different management Groups; systems for linking the enterprise

Interactive session: Organizations Domino's Sizzles with Pizza Tracker

System for Collaboration and teamwork

Interactive session: Management: Virtual meetinigs: Smart Management

The information systems function in business; the information systems department; organizing the information systems function

Hands-on MIS project

Management decision problems; improving decision making: Using a spreadsheet to select suppliers; Achieving operational excellence: Using Internet Software to Plan Efficient Transportation Routes

Systems from a functional perspective: IT enables collaboration and teamwork; challenges of using business information systems; organizing the information systems function

Unit 3 : Information Systems, Organizations and Strategy

Opening Case: Verizon or AT&T – which company has the best digital strategy? Organizations and Information systems

How Information Systems impact organizations and business firms; economic impacts; organizational and behavioral impacts; the Internet and organizations; implications for the design and understanding of information systems

Using information systems to achieve competitive advantage; Porter' Competitive Forces Model; Information system Strategies for dealing with competitive forces; the Internet's impact on competitive advantage

Interactive Session: Organizations How much do credit card companies Know About You? The Business value chain model

Using systems for competitive advantage: Management Issues; sustaining competitive advantage; Aligning IT with business objectives; Managing Strategic Transitions

Hands-on MIS Projects; Management Decision Problems; Improving Decision making: Using a database to clarify business strategy; improving decision making: Using web tools to configure and price an automobile

Unit 4: Ethical and Social Issues in Information Systems

Opening Cases: Behavioral Targeting and Your Privacy: You're the Target

Understanding Ethical and Social issues related to systems

A model for thinking about ethical, social and political issues; five moral dimensions of the information age; key technology trends that raise ethical issues

Interactive session: Organizations The Perils of Texting Interactive session: Technology Too much technology Hands-on MIS Projects

Unit 5: Information Technology Infrastructure

IT infrastructure and emerging technologies

Opening case: BART Speeds Up with a new IT infrastructure

IT infrastructure; Defining IT infrastructure; evolution of IT infrastructure; Technology Drivers of infrastructure evolution

Infrastructure components; computer hardware platforms; operating system platforms; enterprise software applications

Interactive session: technology New on the eTouch

Data Management and storage; networking/ telecommunications platforms; Internet Platforms; Consulting and System integration services

Interactive session: Organizations Is Green Computing Good for business? Hands-on MIS project

Unit 6: Foundations of Business Intelligence: Databases and Information Management

Opening Case: RR Donnelly Tries to Master its data

Organizing Data in a traditional file environment; file organization concepts; problems with the traditional file environment

The database approach to data management: Database Management Systems; capabilities of database Management systems; designing database

Using databases to improve business performance and decision making; data warehouses; tools for business intelligence: Multidimensional data analysis and data mining

Interactive session: Technology: What can businesses learn from text mining? Hands-on MIS projects

Unit 7: Securing Information Systems

Opening Case: You're on Facebook? Watch Out

System vulnerability and abuse: vulnerability; malicious softwares; hackers and computer crime; Internal Threats: employees;

Business value of security and control; legal and regulatory requirements for electronic records management; electronic evidence and computer forensics

Establishing a framework for security and control; information systems controls; risk assessment; security policy; disaster recovery planning and business continuity planning; the role of auditing Hands-on MIS projects

Unit 8 : Building Information Systems

Opening Case: CIMB Group Redesigns Its Account Opening Process Systems as Planned Organizational Change

Systems Development and Organizational Change • Business Process

Redesign

Overview of Systems Development

Interactive Session: Organizations Can Business Process Management Make a Difference? Systems Analysis • Systems Design • Completing the Systems Development Process • Modeling and Designing Systems: Structured and Object-Oriented Methodologies

Alternative Systems-Building Approaches

Traditional Systems Life Cycle • Prototyping • End-User Development • Application Software Packages and Outsourcing

Interactive Session: Technology Zimbra Zooms Ahead with OneView Application Development for the Digital Firm

Rapid Application Development (RAD) • Component-Based Development and Web Services Hands-on MIS Projects

Text Book

Laudon, Laudon, “*Management Information Systems Managing the Digital Firm*”, twelfth edition

1	Name of Course/Module : SYSTEM SOFTWARE AND ADMINISTRATION						
2	Course Code: CSA-356						
3	Name(s) of academic staff:						
4	Rationale for the inclusion of the course /module in the programme: This course is designed for those students who are interested in learning about the system software and its administration. Therefore, this course of study provides understanding about the software packaging and its troubleshooting.						
5	Semester and Year offered: year 3 semester 5						
6	Course Hours	Face to Face				ILT	TSLT
		L	T	P	O		
	L=Lecture T=Tutorial P=Practical O=Others TSLT=Total student learning time	55	3	22	6	80	166
7	Credit Value:4						
8	Prerequisite: Nil						
9	Course Learning Outcomes: On completion of this course students will be able to: <ul style="list-style-type: none"> • Demonstrate the practical skills on automating administrative task within a team. • Understands and effectively manages the process of developing designing, testing, and delivering a software application. • Identify the problem and synthesize information from multiple sources to solve the problem or complete the task at hand. 						
10	Transferable Skills: <ul style="list-style-type: none"> • Critical Thinking & Problem Solving Skills • Team work • Evaluating results 						
11	Teaching –learning and assessment strategy <ul style="list-style-type: none"> • Lectures • Tutorials At the end of the programme, students are given an opportunity to evaluate the course and the lecturer.						
12	Synopsis: This module provides wide range of understanding about system software with its installation concepts and helps to maintain awareness and understanding of emerging technology. It covers the topic like projects, multi-user basics, networking, backup and disaster recovery.						
13	Mode of Delivery: Lectures, Tutorials, practical.						

14	Assessments Methods and Types: Assignments 20% Mid Exam 20% Final Exam 50% Quiz 10% Total 100%							
15	Content Outline of the course/module and the SLT per topic							
	No	Subject description	Face to face				ILT	Total
			Lecture	Tutorial	Practical	Others		
	1.	Introduction: <ul style="list-style-type: none">• Policies• Overview• UNIX history• UNIX history• Hardware assembly and troubleshooting• Operating system installation• Booting	9	3	-	-	12	24
	2.	Projects: <ul style="list-style-type: none">• Planning• Estimates• Client interaction and expectations• Service level agreements• Record management	8	-	4	-	12	24
	3.	Software Installation Concepts: <ul style="list-style-type: none">• Software packaging• Software troubleshooting• Log files• Backup methodologies• Maintenance requirements and methods• Registries and system files• Security	9	-	5	-	14	28
4.	Multi-User Basics: <ul style="list-style-type: none">• Policies• Policies and ethics• Automating administrative task• Simple shell script• User account creation	5	-	2	-	7	14	

5.	Networking: <ul style="list-style-type: none"> • The internet • WASs & LANS • TCP Dump • SMTP • HTTP • DNS tracking • Traceroute • Geolocation 	9	-	4	-	13	26
6.	Backup and Disaster Recovery: <ul style="list-style-type: none"> • Programming write a backup tool • Distributed computing • SNMP • System Security 	5	-	2	-	7	14
7.	Servers: <ul style="list-style-type: none"> • Hardware • User management • Resource management • Permissions • Command & control • Domains & groups • File systems • Sharing files • System virtualization • Remote management 	10	-	5	-	15	30
	Total	55	3	22	-	80	160

16. **Main references supporting the course:**

- Thomas A. Limoncelli, Christine Hogan, Strata R. Chalup , The Practice of System and Network Administration , 2nd ed., 2007
- Mark Burgess, Principles of Network and System Administration, 2004
- Aeleen Frisch, Essential System Administration, 3rd ed., 2002
- Evi Nemeth, Garth Snyder, Trent R. Hein, Ben Whaley, UNIX and Linux System Administration, 4th ed., 2010

1	Name of Course/Module : CLOUD COMPUTING						
2	Course Code: BIT 361						
3	Name(s) of academic staff:						
4	Rationale for the inclusion of the course /module in the programme: This course provides a hands-on comprehensive study of Cloud concepts and capabilities across the various Cloud service models.						
5	Semester and Year offered: year 3 semester 6						
6	Course Hours	Face to Face				ILT	TSLT
		L	T	P	O		
	L=Lecture T=Tutorial P=Practical O=Others TSLT=Total student learning time	44	-	36	6	80	166
7	Credit Value:4						
8	Prerequisite: Nil						
9	Course Learning Outcomes: On completion of this course students will be able to: <ul style="list-style-type: none">Analyze the trade-offs between deploying applications in the cloud and over the local infrastructure.Compare the advantages and disadvantages of various cloud computing platforms.Solve a real-world problem using cloud computing through group collaboration.						
10	Transferable Skills: <ul style="list-style-type: none">Critical Thinking & Problem Solving SkillsInformation Management & Life Long LearningEvaluating results						
11	Teaching –learning and assessment strategy <ul style="list-style-type: none">LecturesTutorials At the end of the programme, students are given an opportunity to evaluate the course and the lecturer.						
12	Synopsis: The course introduces the core concepts of cloud computing and helps to gain the foundational knowledge required for understanding cloud computing from a business perspective as also for becoming a cloud practitioner.						
13	Mode of Delivery: Lectures, Tutorials, practical.						

14	Assessments Methods and Types: Assignments 20% Mid Exam 20% Final Exam 50% Quiz 10% Total 100%							
15	Content Outline of the course/module and the SLT per topic							
	No	Subject description	Face to face				ILT	Total
			Lecture	Tutorial	Practical	Others		
	1.	Introduction: <ul style="list-style-type: none">• The emergence of cloud computing• Cloud-Based services• Grid computing or cloud computing• Components of cloud computing• Virtualization• Cloud computing deployment models• Benefit of using cloud model• Legal Issues in Using cloud models• Characteristics of Cloud Computing• Evolution of cloud computing• Challenges for the cloud computing• Grid computing• Distributed computing in Grid and Cloud	10	-	8	-	18	36

	2.	Cloud Service Models: <ul style="list-style-type: none"> • Communication as a service (CaaS) • Advantages of CaaS • Fully Integrated • Enterprise Class Unified Communications • Infrastructure as a Service (IaaS) • Modern On Demand Computing • Amazon's elastic cloud • Amazon EC2 service characteristics • Monitoring as a service (MaaS) • Protection Against Internal and External Threats • Platform as a service (PaaS) • The Traditional on premises model • The new cloud model • Key characteristics of PaaS • Software as a Service (SaaS) • SaaS implementation Issues • Key characteristics of SaaS • Benefits of the SaaS Model • Jericho cloud cube model 	15	-	10	-	25	50
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	3.	Buildin Cloud Network: <ul style="list-style-type: none"> • Evolution from Managed Service Providers (MPS) to cloud computing • Single purpose architectures to multi-purpose architectures • Data center virtualization • Cloud data center • Service oriented architectures (SOA) • Combining in SOA • Characterizing SOA • Open source software in data centers • Open source in cloud computing • Web presence (Apache, Jetty, Zend Framework) • Database Tier (MySQL), PostgreSQL) • Application Tier (Zope, Plone, AJAX, Apache Struts) • System and Network Management Tier 	8	-	9	-	17	34
	4.	Security In Cloud Computing: <ul style="list-style-type: none"> • Cloud security challenges • Software as a service • Security management • Risk management • Security monitoring and incident response • Security architecture design • Vulnerability • Assessment • Data privacy and security • Data control • Application security • Virtual machine security • Network intrusion detection • Implementing network detection in the cloud • Host intrusion detection • Disaster recovery • Disaster recovery planning • Disasters in cloud • Disaster management 	11	-	9	-	20	40
		Total	44	-	36	-	80	160

16.	<p>Main references supporting the course:</p> <ul style="list-style-type: none"> • Cloud Computing: Implementation Management and Security, John W. Rittinghouse and James F. Ransome • Cloud Application architecture, George Reese. • Cloud Computing for Dummies, Judith Hurwitz, Robin Bloor, Marcia Kaufman, Fern Halper • Handbook of cloud computing, Borko Furht, Armando Escalante • Cloud Computing and SOA Convergence in your Enterprise, a step by step guide, David S. Linthicum
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