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GURU JAMBHESHWAR UNIVERSITY OF SCIENCE & TECHNOLOGY, HISAR
(Established by State Legislature Act 17 of 1995)
'A' Grade, NAAC Accredited

Acad./AC-III/F-19/2019/ 2795

Dated: 7/7/19

The Controller of Examinations
GJUS&T, Hisar.

Sub: Approval of Scheme of examination & Syllabi of various courses under the Faculty of Physical Sciences & Technology.

I am directed to inform you that the Vice-Chancellor, on the recommendations the Faculty of Physical Sciences & Technology, vide resolution no. 2 in its meeting held on 19.03.2019, is please to approve the Scheme & Syllabi of the following combinations of the Under Graduate courses of B.Sc. (Physical Sciences) – 3rd semester onwards being run in affiliated degree Colleges in District, Hisar w.e.f academic session 2018-19 in anticipation of approval of the Academic Council under Section 11(5) of the University Act, 1995:.

- (i) B.Sc. (Physical Sciences: Physics, Chemistry, Mathematics)
- (ii) B.Sc. (Physical Sciences: Geography, Computer Science, Mathematics)
- (iii) B.Sc. (Physical Sciences: Physics, Electronics, Mathematics)
- (iv) B.Sc. (Physical sciences: Physics, Computer Science, Mathematics)
- (v) B.Sc. (Physical Sciences: Physics, Computer Applications, Mathematics)

A copy of the scheme & syllabi of the above said programme(s) is enclosed herewith.

This is for your information and further necessary action in the matter.

DA: As above

Kangra
01/7/19
Dy. Registrar (Academic)

Endst. No.Acad./AC-III/F-19/2019/ 2796-2805 Dated: 1/7/19

A copy of the above is forwarded to the following for information and necessary action:-

1. Dean Academic Affairs, GJUS&T, Hisar.
2. Dean of Colleges, GJUS&T, Hisar.
3. Dean, Faculty of Physical Sciences & Technology, GJUS&T, Hisar.
4. Chairperson, Deptt. of Physics, GJUS&T, Hisar.
5. Chairperson, Deptt. of Chemistry, GJUS&T, Hisar.
6. Chairperson, Deptt. of Mathematics, GJUS&T, Hisar.
7. Chairperson, Deptt. of CSE, GJUS&T, Hisar.
8. Chairperson, Deptt. of ECE, GJUS&T, Hisar.
9. All concerned Affiliated Degree Colleges, GJUS&T, Hisar alongwith a copy of the scheme and syllabi of B.Sc. courses
- 10.. SVC (for kind information of Vice-Chancellor), GJUS&T, Hisar.

Kangra
01/7/19
Dy. Registrar (Academic)

CHOICE BASED CREDIT SYSTEM

(CBCS)

Guru Jambheshwar University of Science and Technology, Hisar

Scheme and Syllabi
for
(Third Semester Onwards)

Undergraduate Course:

B. SC. PHYSICAL SCIENCES

(PHYSICS/GEOGRAPHY, CHEMISTRY/
ELECTRONICS/ COMPUTER SCIENCE/ COMPUTER
APPLICATIONS, MATHEMATICS)

Under
The Faculty of Physical Sciences and Technology



w.e.f. Academic Session 2018-19

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Credit Distribution for B.Sc. programme under Choice Based Credit System (CBCS)

		Core Courses (CC)	Discipline Specific courses(DSC)	Skill Enhancement Courses(SEC)	Total Credits (CC+DSC)	Theory + Practical+SEC
Theory (T); Practical(P)						
	Physics (T)	16	08	2	24	38
	Physics (P)	08	04		12	
	Geography(T)	16	08	2	24	38
	Geography(P)	08	04		10	
	Chemistry(T)	16	08	2	24	38
	Chemistry(P)	08	04		10	
	Electronics(T)	16	08	2	24	38
	Electronics(P)	08	04		10	
	Computer Science(T)	16	08	2	24	38
	Computer Science(P)	08	04		10	
	Computer Applications(T)	16	08	2	24	38
	Computer Applications(P)	06	04		10	
	Mathematics(T)	32	24	2	56	64
	Mathematics(P)	06	--		06	
Language skills		08	--	--	08	08
Awareness program		02	--	--	02	02
Total	PCM/GCsM/PEM/PCsM/PCaM(T)	60	40	06	100	140
	PCM/GCsM/PEM/PCsM/PCaM(P)	18	08		26	

Total Credits required to pass the course -140+10=150

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Semester wise Distribution of Credits

		I Sem.	II Sem.	III Sem.	IV Sem.	V Sem.	VI Sem.	Total credits
Language Skills								
English(4)		2	2	--	--	--	--	4
Hindi(4)		--	--	2	2	--	--	4
Awareness program								
Env.Science(2)		2	--	--	--	--	--	2
Subjects								
Physics (38)	Theory	4	4	4	4	4	4	24
	Practical	2	2	2	2	2	2	12
	SEC	--	--	--	2	--	--	2
Chemistry(38)	Theory	4	4	4	4	4	4	24
	Practical	2	2	2	2	2	2	12
	SEC	--	--	--	--	2	--	2
Mathematics(64)	Theory	8	8	8	8	12	12	56
	Practical	1.5	1.5	1.5	1.5	--	--	6
	SEC	--	--	--	--	--	2	2
Geography(38)	Theory	4	4	4	4	4	4	24
	Practical	2	2	2	2	2	2	12
	SEC	--	--	--	--	--	--	2
Electronics(38)	Theory	4	4	4	4	4	4	24
	Practical	2	2	2	2	2	2	12
	SEC	--	--	--	--	2	--	2
Computer Science(38)	Theory	4	4	4	4	4	4	24
	Practical	2	2	2	2	2	2	12
	SEC	--	--	--	--	--	--	2
Computer applications(38)	Theory	4	4	4	4	4	4	24
	Practical	2	2	2	2	2	2	12
	SEC	--	--	--	--	--	--	2
PCM/GCsM/PEM/PCsM/PCaM	Theory	16	16	16	16	20	20	104
	Practical	5.5	5.5	5.5	5.5	4	4	30
	SEC	--	--	--	2	2	2	06
Total credits/semester (three Subjects)		21.5	21.5	21.5	23.5	22	22	140

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Note:

- (1) The subject combinations under B.Sc. (Physical Sciences) are :
 - (i) B.Sc. (Physical Sciences: Physics, Chemistry, Mathematics)
 - (ii) B.Sc. (Physical Sciences: Geography, Computer Science, Mathematics)
 - (iii) B.Sc. (Physical Sciences: Physics, Electronics, Mathematics)
 - (iv) B.Sc. (Physical Sciences: Physics, Computer Science, Mathematics)
 - (v) B.Sc. (Physical Sciences: Physics, Computer Applications, Mathematics)
- (2) The scheme and syllabus of Mathematics papers is also implemented to BA (with Mathematics) Courses. However, the marking scheme in case of BA courses (Mathematics Subject) will be same as decided by the concerned Board of Studies/Faculty of Humanities and Social Sciences.
- (3) For the students of B.Sc. Geography, the Core Course(CC)/Discipline Specific Course(DSC)/Skill Enhancement Course (SEC) papers of Physics is to be replaced by the respective papers of the Geography; for Computer Science, the Core Course(CC)/Discipline Specific Course(DSC)/Skill Enhancement Course (SEC) papers of Chemistry is to be replaced by respective papers of the Computer Sciences; for Electronics the Core Course(CC)/Discipline Specific Course(DSC)/Skill Enhancement Course (SEC) papers of Chemistry is to be replaced by respective papers of the Electronics and similarly for Computer Applications, the Core Course(CC)/Discipline Specific Course(DSC)/Skill Enhancement Course (SEC) papers of Chemistry is to be replaced by respective papers of the Computer Applications as decided by the respective Board of studies/Faculty of Engineering and Technology.
- (4) Definition of Credit:
1 credit=1 Hr. Lecture (L) per week
1 credit= 2 Hrs. Practical (P) per week
2 Hrs. = 3 periods of approx. 40/45 minutes
- (5) Practical examinations (both odd and even semester's practicals of 100 marks each) to be held annually with even semesters. The marks of Odd semester practicals may be reflected in the DMC of Even semester with code and nomenclature, to be shown separately for each semester.
- (6) The distribution of internal assessment marks of 20 is based on the marks obtained by the student in one Minor test of 12 marks to be conducted preferably in the month of November for Odd Semester and in the month of April for Even Semester. A student is required to pass the individual paper with 35% marks overall including internal assessment based on minor test. He may not be given any additional chance for minor test. However, the student also needs to pass the external examination individually with 35% marks. There will be maximum 4 marks for attendance (1 mark for attendance of 71-75%, 2 marks for attendance of 76-80%, 3 marks for attendance of 81-85% and 4 marks for attendance above 85%). The remaining 4 marks are for Extra-curricular activities including assignments.
- (7) The Batches of 20 or more can be opted for various courses as per requirement for all practical purposes by the college/institution. The evaluation of Practical may be distributed as 20% marks for lab record, 50% marks for performance during the examination and 30% marks for Viva Voce examination.
- (8) SWAYAM-MOOCs (Study Webs of Active Learning for young Aspiring Minds-Massive Online Open Courses)/NPTEL(National Programme on Technology Enhanced Learning) can be opted by the candidate either under DSC or SEC for maximum upto 12 credits (Two DSCs or One DSC and one SEC).
- (9) SEC courses: One SEC by Physics department in Forth semester, One SEC has to be offered by Chemistry in fifth semester and One SEC has to be offered by Mathematics in Sixth semester. All SECs will be of 50(Internal):50(External)marks. The internal marks will be based on practical aspect of skill enhancement.

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The consolidated scheme and syllabi of Three Years of B.Sc. (Physical Sciences: Physics/Geography, Chemistry/Electronics/Computer Science/Computer Applications, Mathematics) is as under:

Semester-I

Paper Code	Course opted	Nomenclature	Credits	Hr/week	Marks		
					Ext.	Int.	Total
CXL- 101	Language Skills Compulsory Course-I	English-I	2	2	80	20	100
CPL- 102	Core Course-I (Physics)	Mechanics-I	2	2	80	20	100
CPL- 103	Core Course-II (Physics)	Electricity and Magnetism-I	2	2	80	20	100
CGL- 102	Core Course-I (Geography)	Physical Geography-I	2	2	80	20	100
CGL- 103	Core Course-II (Geography)	Physical Geography-II	2	2	80	20	100
CCL- 104	Core Course-I (Chemistry)	Inorganic Chemistry-I(Atomic structure and Bonding)	2	2	80	20	100
CCL- 105	Core Course-II (Chemistry)	Organic Chemistry-I(General Organic Chemistry and Aliphatic Hydrocarbons)	2	2	80	20	100
CEL- 104	Core Course-I (Electronics)	Network Analysis and Electronic Devices	2	2	80	20	100
CEL- 105	Core Course-II (Electronics)	Analog Electronics	2	2	80	20	100
CCsL- 104	Core Course-I (Computer Science)	Fundamentals of Computer	2	2	80	20	100
CCsL- 105	Core Course-II (Computer Science)	Programming in 'C'	2	2	80	20	100
CCaL- 104	Core Course- I (Computer Applications)	Computer Fundamentals and Operating System	2	2	80	20	100
CCaL- 105	Core Course- II (Computer Applications)	Office Automation Tools	2	2	80	20	100
CML- 106	Core Course-I (Mathematics)	Algebra	4	4	80	20	100
CML- 107	Core Course-I (Mathematics)	Calculus	4	4	80	20	100
CYL- 111	Awareness Program Compulsory Course	Environmental Studies	2	2	80	20	100
CPP- 108*	Practical-I (Physics)	Physics Lab-I	2	4	100	-	100
CGP- 108*	Practical-I (Geography)	Geography Lab-I	2	4	100	-	100
CCP- 109*	Practical-I (Chemistry)	Chemistry Lab-I	2	4	100	-	100
CEP- 109*	Practical-I (Electronics)	Electronics Lab-I (Network Analysis and Analog Electronics)	2	4	100	-	100
CCsP- 109*	Practical-I (Computer Science)	Computer Lab-I (Based on Fundamentals of Computer & Programming in 'C')	2	4	100	-	100
CCaP- 109*	Practical- I (Computer Applications)	Computer Lab-I	2	4	100	-	100
CMP- 110*	Practical-I (Mathematics)	Mathematics Lab-I	1.5	3	100	-	100

- The practical examination to be conducted annually with Second semester examination.

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Semester-II

Paper Code	Course opted	Nomenclature	Credits	Hr/ week	Marks		
					Ext.	Int.	Total
CXL- 201	Language Skills Compulsory Course-II	English-II	2	2	80	20	100
CPL- 202	Core Course-III (Physics)	Mechanics-II	2	2	80	20	100
CPL- 203	Core Course-IV (Physics)	Electricity, Magnetism and Electromagnetic Theory -II	2	2	80	20	100
CGL- 202	Core Course-III (Geography)	Human Geography-I	2	2	80	20	100
CGL- 203	Core Course-IV (Geography)	Human Geography-II	2	2	80	20	100
CCL- 204	Core Course-III (Chemistry)	Physical Chemistry- I (Chemical Energetics and Equilibria)	2	2	80	20	100
CCL- 205	Core Course-IV (Chemistry)	Organic Chemistry- II (Functional Group Organic Chemistry)	2	2	80	20	100
CEL- 204	Core Course-III (Electronics)	Linear and Digital Integrated circuits	2	2	80	20	100
CEL- 205	Core Course-IV (Electronics))	Digital Electronics	2	2	80	20	100
CCsL- 204	Core Course-III (Computer Science)	Data Structure using 'C'	2	2	80	20	100
CCsL- 205	Core Course-IV (Computer Science)	Computer Organisation	2	2	80	20	100
CCaL- 204	Core Course- III (Computer Applications)	Information Technology	2	2	80	20	100
CCaL- 205	Core Course- IV (Computer Applications)	Programming in 'C'	2	2	80	20	100
CML- 206	Core Course-III (Mathematics)	Ordinary Differential Equations and Laplace Transformations	4	4	80	20	100
CML- 207	Core Course-IV (Mathematics)	Vector Calculus and Geometry	4	4	80	20	100
CPP- 208	Practical-II (Physics)	Physics Lab-II	2	4	100	-	100
CGP- 208	Practical-II (Geography)	Geography Lab-II	2	4	100	-	100
CPP-209	Practical-II (Chemistry)	Chemistry Lab-II	2	4	100	-	100
CEP-209	Practical-II (Electronics)	Linear Integrated circuits and Digital Electronics Lab	2	4	100	-	100
CCsP-209	Practical-II (Computer Science)	Computer Lab-II (Based on Data Structure using 'C')	2	4	100	-	100
CCaP-209	Practical-II (Computer Applications)	Computer Lab- II	2	4	100	-	100
CMP-210	Practical-II (Mathematics)	Mathematics Lab-II	1.5	3	100	-	100

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Semester-III

Paper Code	Course opted	Nomenclature	Credits	Hr/ week	Marks		
					Ext.	Int.	Total
CXL- 301	Language Skills Compulsory Course-III	Hindi-I	2	2	80	20	100
CPL- 302	Core Course-V (Physics)	Heat and Thermodynamics	2	2	80	20	100
CPL- 303	Core Course-VI (Physics)	Semiconductor Devices	2	2	80	20	100
CGL-302	Core Course-V (Geography)	Geography of India	2	2	80	20	100
CGL- 303	Core Course-VI (Geography)	Regional Planning with special reference to Haryana	2	2	80	20	100
CCL- 304	Core Course-V (Chemistry)	Physical Chemistry-II (Solutions, Phase Equilibrium, Conductance & Electrochemistry)	2	2	80	20	100
CCL- 305	Core Course-VI (Chemistry)	Organic Chemistry-III (Functional Group Organic Chemistry-II)	2	2	80	20	100
CEL- 304	Core Course-V (Electronics))	Communication Electronics-I	2	2	80	20	100
CEL- 305	Core Course-VI (Electronics))	Microprocessor	2	2	80	20	100
CCsL- 304	Core Course-V (Computer Science)	Database Management System	2	2	80	20	100
CCsL- 305	Core Course-VI (Computer Science)	Operating System	2	2	80	20	100
CCaL- 304	Core Course- V (Computer Applications)	Web Development	2	2	80	20	100
CCaL- 305	Core Course- VI (Computer Applications)	Operating System	2	2	80	20	100
CML- 306	Core Course-V (Mathematics)	Advanced Calculus	4	4	80	20	100
CML- 307	Core Course-VI (Mathematics)	Numerical Analysis	4	4	80	20	100
CPP- 308*	Practical-III (Physics)	Physics Lab-III	2	4	100	-	100
CGP- 308*	Practical-III (Geography)	Geography Lab-III	2	4	100	-	100
CCP- 309*	Practical-III (Chemistry)	Chemistry Lab-III	2	4	100	-	100
CEP- 309*	Practical-III (Electronics)	Communication Electronics Lab- III	2	4	100	-	100
CCsP- 309*	Practical-III (Computer Science)	Computer Lab-III (DBMS Lab)	2	4	100	-	100
CCaP-309*	Practical- III (Computer Applications)	Computer Lab-III (Web Development Lab)	2	4	100	-	100
CMP- 310*	Practical-III (Mathematics)	Mathematics Lab-III	1.5	3	100	-	100

- The practical examination to be conducted annually with Fourth semester examination.

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Semester-IV

Paper Code	Course opted	Nomenclature	Credits	Hr/ week	Marks		
					Ext.	Int.	Total
CXL- 401	Language Skills Compulsory Course-IV	Hindi-II	2	2	80	20	100
CPL- 402	Core Course-VII (Physics)	Statistical Mechanics	2	2	80	20	100
CPL- 403	Core Course-VIII (Physics)	Waves and Optics	2	2	80	20	100
CGL- 402	Core Course-VII (Geography)	Environmental Geography	2	2	80	20	100
CGL- 403	Core Course-VIII (Geography)	Geography of Disaster	2	2	80	20	100
CCL- 404	Core Course-VII (Chemistry)	Inorganic Chemistry-II(Transition Metals & Coordination Chemistry)	2	2	80	20	100
CCL- 405	Core Course-VIII (Chemistry)	Physical Chemistry-III(States of Matter & Chemical Kinetics)	2	2	80	20	100
CEL- 404	Core Course-VII (Electronics)	Communication Electronics-II	2	2	80	20	100
CEL- 405	Core Course-VIII (Electronics))	Microcontroller	2	2	80	20	100
CCsL- 404	Core Course-VII (Computer Science)	Software Engineering	2	2	80	20	100
CCsL- 405	Core Course-VIII (Computer Science)	Computer Networks	2	2	80	20	100
CCaL- 404	Core Course- VII (Computer Applications)	Database Management System	2	2	80	20	100
CCaL- 405	Core Course- VIII (Computer Applications)	Data Analysis	2	2	80	20	100
CML- 406	Core Course-VII (Mathematics)	Partial Differential Equations & Special Functions	4	4	80	20	100
CML- 407	Core Course-VIII (Mathematics)	Mechanics-I	4	4	80	20	100
CPP- 408*	Practical-IV (Physics)	Physics Lab-IV	2	4	100	-	100
CPS- 409	Skill Enhancement Course-I (Physics)	Electrical Circuits and Network Skills	2	2	50	50	100
CGP- 408	Practical-IV (Geography)	Geography Lab-IV	2	4	100	-	100
CCP-409	Practical-IV (Chemistry)	Chemistry Lab-IV	2	4	100	-	100
CEP-409	Practical-IV (Electronics)	Microprocessor and Microcontroller Lab-IV	2	4	100	-	100
CCsP-409	Practical-IV (Computer Science)	Computer Lab-IV (Computer Networks lab)	2	4	100	-	100
CCaP-409	Practical-IV (Computer Applications)	Computer Lab- IV (DBMS Lab)	2	4	100	-	100
CMP-410	Practical-IV (Mathematics)	Mathematics Lab-IV	1.5	3	100	-	100

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Semester-V

Paper Code	Course opted	Nomenclature	Credits	Hr/ week	Marks		
					Ext.	Int.	Total
CPL- 501	Discipline Specific Course-I (Physics)	Elements of Modern Physics	2	2	80	20	100
CPL- 502	Discipline Specific Course -II (Physics)	Nuclear Physics	2	2	80	20	100
CGL-501	Discipline Specific Course-I (Geography)	Geography	2	2	80	20	100
CGL- 502	Discipline Specific Course-II (Geography)	Geography	2	2	80	20	100
CCL- 503(i) OR CCL- 503(ii)	Discipline Specific Course-I (Chemistry)	Polymer Chemistry-I OR Chemistry of Main Group Elements, Theories of Acids and Bases-I	2	2	80	20	100
CCL- 504(i) OR CCL- 504(ii)	Discipline Specific Course-II (Chemistry)	Polymer Chemistry-II OR Chemistry of Main Group Elements-II	2	2	80	20	100
CCS- 505(i) OR CCS- 505(ii)	Skill Enhancement Course-I(Chemistry)	Pesticide Chemistry OR Fuel Chemistry	2	2	50	50	100
CEL- 503(i) OR CEL- 503(ii) OR CEL- 503(iii)	Discipline Specific Course-I (Electronics)	Electronic Instrumentation-I OR Signal and System OR Semiconductor Devices Fabrication	2	2	80	20	100
CEL- 504(i) OR CEL- 504(ii) OR CEL- 504(iii)	Discipline Specific Course-II (Electronics)	Electronic Instrumentation-II OR Programming with Sci Lab/Mat lab OR Antenna Theory	2	2	80	20	100
CEL- 505(i) OR CEL- 505(ii) OR CEL- 505(iii)	Skill Enhancement Course-III (Electronics)	PCB Design and Fabrication OR Robotics OR Mobile Application Programming	2	2	50	50	100
CCsL- 503	Discipline Specific Course-I (Computer Science)	Object Oriented Programming using C++	2	2	80	20	100
CCsL- 504	Discipline Specific Course-II (Computer Science)	Data Analytics	2	2	80	20	100
CCaL- 503	Discipline Specific Course- I (Computer Applications)	Object Oriented Programming using Java	2	2	80	20	100
CCaL- 504	Discipline Specific Course- II (Computer Applications)	Computer Networks	2	2	80	20	100

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CML- 506(i) OR CML- 506(ii)	Discipline Specific Course-I (Mathematics)	Groups and Rings OR Sampling Techniques	4	4	80	20	100
CML- 507(i) OR CML- 507(ii)	Discipline Specific Course-II (Mathematics)	Sequence & Series OR Sample Survey and Design of Experiments	4	4	80	20	100
CML- 508(i) OR CML- 508(ii)	Discipline Specific Course-III (Mathematics)	Number Theory & Trigonometry OR Integer programming & Theory of Games	4	4	80	20	100
CPP- 508*	Practical-V (Physics)	Physics Lab-V	2	4	100	-	100
CGP- 508*	Practical-V (Geography)	Geography Lab-V	2	4	100	-	100
CCP- 509(i)* OR CCP- 509(ii)	Practical-V (Chemistry)	Chemistry Lab-V(i) OR Chemistry Lab-V(ii)	2	4	100	-	100
CEP- 509(i)* OR CEP- 509(ii)* OR CEP- 509(iii)*	Practical-V (Electronics)	Electronic Instrumentation Lab OR Signal and System Lab OR Electronics skill lab	2	4	100	-	100
CCsP- 509*	Practical-V (Computer Science)	Computer Lab-V (Object Oriented Programming using C++ Lab)	2	4	100	-	100
CCaP-509*	Practical- V (Computer Applications)	Computer Lab-V (Object Oriented Programming using Java)	2	4	100	-	100

- The practical examination to be conducted annually with Sixth semester examination.

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Semester-VI

Course Code	Course-Title	Nomenclature	Credits	Hr/week	Marks		
					Ext.	Int.	Total
CCL-601	Discipline Specific Course-III (Physics)	Solid State Physics	2	2	80	20	100
CCL-602	Discipline Specific Course-IV (Physics)	Quantum Mechanics	2	2	80	20	100
CCL-601	Discipline Specific Course-III (Geography)	Geography	2	2	80	20	100
CCL-602	Discipline Specific Course-IV (Geography)	Geography	2	2	80	20	100
CCL-603(i) OR CCL-603(ii)	Discipline Specific Course-III (Chemistry)	Organometallics and Bioorganic Chemistry OR Quantum Chemistry	2	2	80	20	100
CCL-604(i) OR CCL-604(ii)	Discipline Specific Course-IV (Chemistry)	Polynuclear Hydrocarbons and UV,IR Spectroscopy OR Spectroscopy and Photochemistry	2	2	80	20	100
CCS-605	Skill Enhancement Course-IV(Chemistry)	Green Methods in Chemistry	2	2	50	50	100
CEL-603(i) OR CEL-603(ii) OR CEL-603(iii)	Discipline Specific Course-III (Electronics)	Digital System Design OR Digital Signal Processing OR Photonic Devices	2	2	80	20	100
CEL-604(i) OR CEL-604(ii) OR CEL-604(iii)	Discipline Specific Course-IV (Electronics)	VLSI Design OR Internet of Things OR Consumer Electronics	2	2	80	20	100
CCsL-603	Discipline Specific Course-III (Computer Science)	Computer Graphics	2	2	80	20	100
CCsL-604	Discipline Specific Course-IV (Computer Science)	Python Programming	2	2	80	20	100
CCaL-603	Discipline Specific Course- III (Computer Applications)	Mobile Application Development	2	2	80	20	100
CCaL-604	Discipline Specific Course- IV (Computer Applications)	Cloud Computing	2	2	80	20	100
CML-605(i) OR CML-605(ii)	Discipline Specific Course-IV (Mathematics)	Linear Algebra OR Bio-Mathematics	4	4	80	20	100
CML-606(i) OR CML-606(ii)	Discipline Specific Course-V (Mathematics)	Mechanics-II OR Queuing and Reliability Theory	4	4	80	20	100

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CML-607(i) OR CML-607(ii)	Discipline Specific Course-VI (Mathematics)	Real & Complex Analysis OR Optimization Techniques	4	4	80	20	100
CMS-608(i) OR CMS-608(ii)	Skill Enhancement Course-IV (Mathematics)	Solid Geometry OR Financial Mathematics	2	2	50	50	100
CPP-608	Practical-VI (Physics)	Physics Lab-VI	2	4	100	-	100
CGP-608	Practical-VI (Geography)	Geography Lab-VI	2	4	100	-	100
CCP-609(i) OR CCP-609(ii)	Practical-VI (Chemistry)	Chemistry Lab-VI(i) OR Chemistry Lab-VI(ii)	2	4	100	-	100
CEP-609(i) OR CEP-609(ii) OR CEP-609(iii)	Practical-VI (Electronics)	Digital System Design Lab OR Digital Signal Processing Lab OR Advance communication Lab	2	4	100	-	100
CCsP-609	Practical-VI (Computer Science)	Computer Lab-VI (Computer Graphics Lab)	2	4	100	-	100
CCaP-609	Practical-VI (Computer Applications)	Computer Lab- VI (Mobile Application Development)	2	4	100	-	100

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Alexandra

Proposed Scheme and syllabus for B.Sc. (physical Sciences) under Choice Based Credit System (CBCS) being run by affiliated degree colleges for the batch 2018-19 onwards.

Semester – III (Computer Science)

CCsL-304	Database Management System
CCsL-305	Operating System
CCsP-309	Computer Lab-III

Semester – IV (Computer Science)

CCsL-404	Software Engineering
CCsL-405	Computer Networks
CCsP-409	Computer Lab-IV

Semester – V (Computer Science)

CCsL-503	Object Oriented Programming using 'C++'
CCsL-504	Data Analytics
CCsP-509	Computer Lab-V

Semester – VI (Computer Science)

CCsL-603	Computer Graphics
CCsL-604	Python Programming
CCsP-609	Computer Lab-VI



Semester – III (Computer Applications)

CCaL-304	Web Development
CCaL-305	Operating System
CCaP-309	Computer Lab-III

Semester – IV (Computer Applications)

CCaL-404	Database Management System
CCaL-405	Data Analytics
CCaP-409	Computer Lab-IV

Semester – V (Computer Applications)

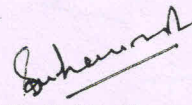
CCaL-503	Object Oriented Programming using Java
CCaL-504	Computer Networks
CCaP-509	Computer Lab-V


Semester – VI (Computer Applications)

CCaL-603	Mobile Application Development
CCaL-604	Cloud Computing
CCaP-609	Computer Lab-VI


(Amit Bansal)


(Garima Mann)


(S. S. Dhillon)


(Dharmender Kumar)



SEMESTER III and IV
B. SC. PHYSICAL SCIENCES
(COMPUTERSCIENCE)

✓

CCsL- 304
Core Course-I (Computer Science)
DATA BASE MANAGEMENT SYSTEM
(Credits: 02, 30 Hrs (2Hrs /week))

Marks for Major Test (External): 80
Marks for Internal Exam: 20
Time: 3 Hours

Paper setter is required to set nine questions in all. Question no. 1 is compulsory and is based on the entire syllabus consisting of eight to ten short answer type questions each of 2 marks. The remaining eight questions are to be set uniformly having two questions from each unit. The student is required to attempt five questions in all selecting one question from each unit and Question No. 1 is compulsory.

UNIT - I

Basic Concepts: A Historical perspective, File Systems vs. DBMS, Characteristics of the Data Base Approach, Abstraction and Data Integration, Database users, Advantages and Disadvantages of DBMS, DBMS architecture, Data Models, Schemas and Instances, Data Independence.

UNIT-II

Entity Relationship (ER) Model: Basic Concepts-Entity, Attributes, Types of Attributes, Entity set and Keys; Relationships-Relationship set, Degree of Relationship, Mapping Cardinalities. ER diagram representation-Representation of Entity, Attributes and Relationship. Binary Representation and Cardinality, Participation Constraints.

UNIT - III

Relational Model : Relational model concepts (Tables, Tuple, Relation instance, Relation schema, Relation key, Attribute domain), Constraints- Key constraints, Domain constraints, Referential integrity constraints; Relational algebra, Basic operations: Select, Project, Union, Set difference, Cartesian product, Rename.

UNIT - IV

Relational Database design: Mapping ER model to relational database, functional dependencies, Lossless decomposition, Desirable properties of decomposition, Normal forms (1 NF, 2 NF, 3 NF and BCNF).

SQL: Why SQL, Data Types; DDL-Create, Alter and Drop table Commands. DML- SELECT/

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FROM/ WHERE, INSERT INTO/ VALUES, UPDATE /SET/ WHERE, DELETE Commands.
UNION [ALL], INTERSECTION and MINUS Operators.

Suggested Readings:

1. Elmasri & Navathe: Fundamentals of Database systems, 3rd Edition, Addison Wesley, New Delhi.
2. Ivan Bayross : SQL, PL/SQL-The Program Language of ORACLE, BPB Publication, New Delhi.
3. Korth & Silberschatz : Database System Concept, 4th Edition, McGraw Hill International Edition.
4. C.J.Date : An Introduction to Data bases Systems 7th Edition, Addison Wesley, New Delhi.

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CCsL- 305
Core Course-II (Computer Science)
OPERATING SYSTEM
(Credits: 02, 30 Hrs (2Hrs /week))

Marks for Major Test (External): 80 Marks
for Internal Exam: 20
Time: 3 Hours

Paper setter is required to set nine questions in all. Question no. 1 is compulsory and is based on the entire syllabus consisting of eight to ten short answer type questions each of 2 marks. The remaining eight questions are to be set uniformly having two questions from each unit. The student is required to attempt five questions in all selecting one question from each unit and Question No. 1 is compulsory.

UNIT - I

Structure of Operating Systems: Layers-MS-DOS Layer Structure, Traditional UNIX System Structure; Running Multiple Operating Systems, Running a Virtual Operating System, Operating System Modes, System Boot.

Process Management: Introduction to Process, Attributes of a process, Process States, Operations on the Process, Process Schedulers, CPU Scheduling, Scheduling Algorithms, Purpose of a Scheduling algorithms. Introduction to FCFS, Shortest Job First (SJF), Shortest Job First (SJF), Round Robin Scheduling Algorithms.

UNIT - II

Memory Management: Fixed and Dynamic partition, Physical and Logical Address Space, Page Table, Mapping from page table to main memory, Page Table Entry, Size of the page table, Finding Optimal Page Size. Virtual Memory Concepts, Advantages and disadvantage of Virtual Memory. Segmentation, Translation of Logical address into physical address by segment table, Advantages and disadvantage of Segmentation. Paging VS Segmentation.

UNIT - III

File Management: Attributes of File, Operations on File; File Access Methods- Sequential, Direct and Indexed Access; Directory Structure, File Systems, File System Structure- different layers; Master Boot Record, Directory Implementation-Linear List and Hash Table; Disk space Allocation Methods- Contiguous Allocation and FAT.

UNIT - IV

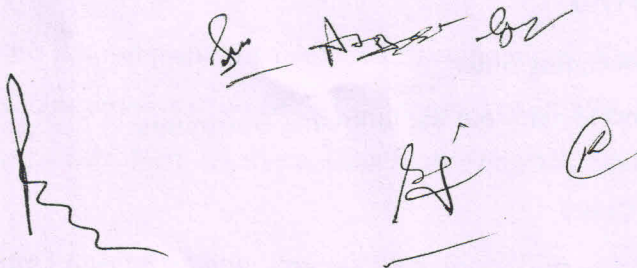


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Shell introduction and Shell Scripting: What is shell and various type of shell, Various editors present in Linux/Unix; Different modes of operation in vi editor; Shell script, Writing and executing the shell script, Shell variable (user defined and system variables); System calls, Pipes and Filters, Decision making in Shell Scripts (If else, switch), Loops in shell, Utility programs (cut, paste, join, tr . uniq utilities), Pattern matching utility (grep)

Suggested Readings:

1. A. Silberschatz, P.B. Galvin, G. Gagne, Operating Systems Concepts, 9 Edition, John Wiley Publications 2015 India Edition.
2. A.S. Tanenbaum, Modern Operating Systems, 3rd Edition, Pearson Education 2007.
3. G. Nutt, Operating Systems: A Modern Perspective, 2nd Edition Pearson Education, 1997.
4. W. Stallings, Operating Systems, Internals & Design Principles , 5th Edition, Prentice.Hall of India. 2008.
5. M. Milenkovic, Operating Systems- Concepts and design, Tata McGraw Hill 1992.



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CCsP- 309
Practical -I: (Computer Science)
Computer Lab--III
(Credits: 02, 60 Hours (4hrs. per week))

Marks: ~~50~~⁴²/100
Time: 3 Hours

A. List of Experiments Using SQL:

1. Create a database and write the commands to carry out the following operation :
 - a. Alter table
 - b. Describe table
 - c. Drop table
2. Create a database and write the programs to carry out the following operation :
 - a. Add a record in the database
 - b. Delete a record in the database
 - c. Modify the record in the database
 - d. Generate queries
 - e. Generate the report
 - f. List all the records of database in ascending order
3. Create a database and write the programs to carry out the following constraints:
 - a. Key constraints
 - b. Domain constraints
 - c. Referential integrity constraints
4. Create a database and write the commands to carry out the following set operation on the database:
 - a. Union
 - b. Intersect
 - c. Minus

B. List of Experiments Operating System Lab:

1. Study of Unix/Linux vi editor.
2. Shell Script To Display Logged in Users, Your UserName and Date / Time.
3. Shell script program to check whether given file is a directory or not.
4. Study of Unix/Linux Utility Programs (cut, paste, join, tr , uniq utilities, grep).
5. Program in C to report behaviour of Linux kernel including kernel version, CPU type and model.
(CPU information)
6. Program in C to Copy a file using UNIX-system calls.
7. Program in C to implement FCFS Scheduling.

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CCsL- 404
Core Course-III (Computer Science)
SOFTWARE ENGINEERING
(Credits: 02, 30 Hrs (2Hrs /week))

Marks for Major Test (External): 80 Marks
for Internal Exam: 20
Time: 3 Hours

Paper setter is required to set nine questions in all. Question no. 1 is compulsory and is based on the entire syllabus consisting of eight to ten short answer type questions each of 2 marks. The remaining eight questions are to be set uniformly having two questions from each unit. The student is required to attempt five questions in all selecting one question from each unit and Question No. 1 is compulsory.

UNIT – I

Introduction: Program vs. Software, Software Engineering paradigms, Software Crisis – problem and causes.

Phases in Software development: Requirement, Analysis, Software Design, Coding, Testing, Maintenance.
Software Development Process Models: Waterfall, Prototype, Evolutionary and Spiral models.

UNIT – II

Software Requirement Analysis and Specifications: Feasibility Study Software Requirements, Need for SRS, Characteristics of an SRS, Components of an SRS, Structure of a requirements document, validation and metrics. Problem Analysis, Data Flow Diagram, Data Dictionary, Decision table, Decision trees

UNIT – III

Software Project Planning: Process Planning, Effort estimation, COCOMO model, Project scheduling and Staffing, team structure, Software configuration management, Quality assurance plans. Risk Management, Project monitoring plans.

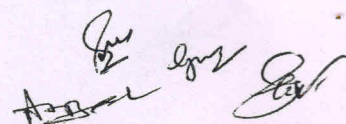
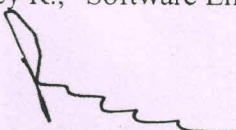
Software Implementation and Maintenance: Type of maintenance, Management of Maintenance, Maintenance Process, maintenance characteristics.

Unit IV

Testing : Testing fundamentals, Error, Fault, and Failure, Test Oracle, Test Case and Test Criteria, Psychology of testing, Black Box Testing, Equivalence Class Partitioning, Boundary value analysis, Cause effect graphing, White box testing , Control flow based criteria, level of testing, Unit testing, Integration testing, System testing, Validation testing, alpha, beta, and Acceptance testing.

Suggested Readings:

1. Pressman R. S., "Software Engineering – A Practitioner's Approach", Tata McGraw Hill.
2. Jalote P., "An Integrated approach to Software Engineering", Narosa.
3. Sommerville, "Software Engineering", Pearson Education.
4. Fairley R., "Software Engineering Concepts", Tata McGraw Hill.



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CCsL- 405
Core Course-IIIV (Computer Science)
COMPUTER NETWORKS
(Credits: 02, 30 Hrs (2Hrs /week))

Marks for Major Test (External): 80 Marks
for Internal Exam: 20
Time: 3 Hours

Paper setter is required to set nine questions in all. Question no. 1 is compulsory and is based on the entire syllabus consisting of eight to ten short answer type questions each of 2 marks. The remaining eight questions are to be set uniformly having two questions from each unit. The student is required to attempt five questions in all selecting one question from each unit and Question No. 1 is compulsory.

UNIT – I

Introduction to Computer Communications and Networking Technologies, Uses of Computer Networks, Network Devices, Nodes, and Hosts, Types of Computer Networks and their Topologies, OSI Reference Model, TCP/IP Reference Model.

UNIT – II

Analog and Digital Communications Concepts: Representing Data as Analog Signals, Representing Data as Digital Signals, Data Rate and Bandwidth, Capacity, Baud Rate; Digital Carrier Systems; Guided and Wireless Transmission Media; Communication Satellites; Switching and Multiplexing.

UNIT - III

Data Link Layer: Framing, Flow Control, Error Control, Error Detection and Correction, Sliding Window Protocols, Media Access Control, Random Access Protocols, Token Passing Protocols, Token Ring, Ethernet, gigabit Ethernet, token ring, FDDI, Bluetooth and Wi-Fi.

UNIT – IV

Network Layer and Routing Concepts: Virtual Circuits and Datagrams, Routing Algorithms, Flooding, Shortest Path Routing, Distance Vector Routing, Link State Routing, Hierarchical Routing, Congestion Control Algorithms, Internetworking, IPV4 and IPV6.

Suggested Readings:

1. Michael A. Gallo, William M. Hancock, "Computer Communications and Networking Technologies", CENGAGE Learning.
2. Andrew S. Tanenbaum, "Computer Networks", Pearson Education.
3. James F. Kurose, Keith W. Ross, "Computer Networking", Pearson Education.
4. Behrouz A Forouzan, "Data Communications and Networking", McGraw Hill.



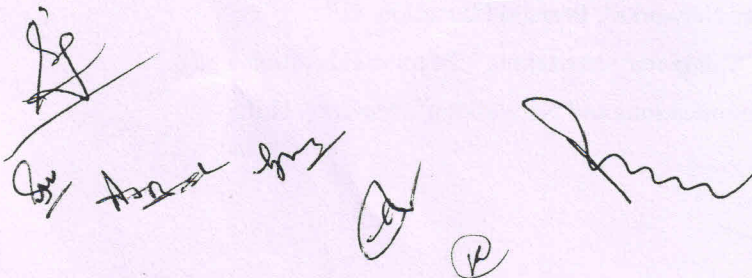
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CCsP- 409
Practical -II: (Computer Science)
Computer Lab--IV
(Credits: 02, 60 Hours (4hrs. per week))

Marks: 50/100
Time: 3 Hours

List of Experiments:

1. Study of different types of Network cables and Practically implement the cross-wired cable and straight through cable using clamping tool.
 - Components: RJ-45 connector, Clipping Tool, Twisted pair Cable
2. Study of Network Devices in Detail.
 - Repeater, Hub, Switch, Bridge, Router, Gate Way
3. Study of network IP.
 - Classification of IP address, Sub netting, Super netting
4. Connect the computers in Local Area Network.
 - Procedure on the host computer
 - Procedure on the client computer
5. Study of basic network command and Network configuration commands.
 - Software: Command Prompt And Packet Tracer.
Configuring the Router commands
General Commands to configure network
Privileged Mode commands of a router
Router Processes & Statistics
IP Commands
Other IP Commands e.g. show ip route etc.
6. Configure a Network topology using packet tracer software.
 - Software: Packet tracer Software
7. Configure a Network using Distance Vector Routing protocol.
 - Software: packet tracer software
8. Configure Network using Link State Vector Routing protocol.
 - Software: packet tracer software



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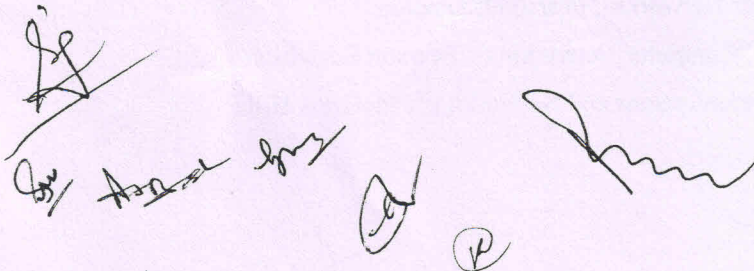
CCsP- 409
Practical -II: (Computer Science)
Computer Lab--IV
(Credits: 02, 60 Hours (4hrs. per week))

Marks: 50 / 100
Time: 3 Hours

List of Experiments:

1. Study of different types of Network cables and Practically implement the cross-wired cable and straight through cable using clamping tool.
 - Components: RJ-45 connector, Clipping Tool, Twisted pair Cable
2. Study of Network Devices in Detail.
 - Repeater, Hub, Switch, Bridge, Router, Gate Way
3. Study of network IP.
 - Classification of IP address, Sub netting, Super netting
4. Connect the computers in Local Area Network.
 - Procedure on the host computer
 - Procedure on the client computer
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 - Software: Command Prompt And Packet Tracer.

Configuring the Router commands
General Commands to configure network
Privileged Mode commands of a router
Router Processes & Statistics
IP Commands
Other IP Commands e.g. show ip route etc.
6. Configure a Network topology using packet tracer software.
 - Software: Packet tracer Software
7. Configure a Network using Distance Vector Routing protocol.
 - Software: packet tracer software
8. Configure Network using Link State Vector Routing protocol.
 - Software: packet tracer software



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SEMESTER V and VI
B. SC. PHYSICAL SCIENCES
(COMPUTE SCIENCE)

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CCsL- 503
Discipline Specific Course-I (Computer Science)
Object Oriented Programming Using 'C++'
(Credits: 02, 30 Hrs (2Hrs /week))

Marks for Major Test (External): 80 Marks
for Internal Exam: 20
Time: 3 Hours

Paper setter is required to set nine questions in all. Question no. 1 is compulsory and is based on the entire syllabus consisting of eight to ten short answer type questions each of 2 marks. The remaining eight questions are to be set uniformly having two questions from each unit. The student is required to attempt five questions in all selecting one question from each unit and Question No. 1 is compulsory.

UNIT - I

Procedure Oriented Programming, Object-Oriented programming Paradigm, difference between Procedure Oriented Programming and Object-Oriented programming, Basic concepts of Object-Oriented programming, Benefits of OOP, Object Oriented Languages, and application of OOP. Structure of a C++ Program, Insertion operator, Extraction operator, Hierarchy of Console Stream Classes, Unformatted and Formatted I/O Operations, Manipulators, inline functions.

UNIT-II

C structure revisited, specifying a Class, Creating Objects, Defining member function, Memory allocation for objects, Scope resolution operator and its significance, Static Data Members, Static member functions, Friend Function, Friend Class.

UNIT - III

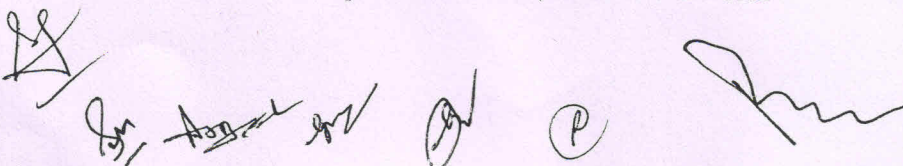
Dynamic Memory Management using new and delete Operator, Constructor, type of constructors, Dynamic initialization of objects, Constructor overloading, Constructor with default arguments, Destructors, function overloading, Operator Overloading, Overloading unary and binary operators.

UNIT - IV

Inheritance, Single Inheritance, Making a private member inheritable, Multilevel Inheritance, Multiple Inheritance, Hierarchical Inheritance, Hybrid Inheritance, Virtual Base Class. Abstract Classes, Constructors in derived classes.

Suggested Readings:

1. Balaguruswami, E., Object Oriented Programming with C++, Tata McGraw-Hill.
2. Robert Lafore, Object Oriented Programming in C++, SAMS Publishing
3. Bjarne Stroustrup, The C++ Programming Language, Pearson Education
4. Herbert Schildt, C++, The Complete Reference, Tata McGraw-Hill



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CCsL- 504
Discipline Specific Course-II (Computer Science)
DATA ANALYTICS
(Credits: 02, 30 Hrs (2Hrs /week))

Marks for Major Test (External): 80 Marks
for Internal Exam: 20
Time: 3 Hours

Paper setter is required to set nine questions in all. Question no. 1 is compulsory and is based on the entire syllabus consisting of eight to ten short answer type questions each of 2 marks. The remaining eight questions are to be set uniformly having two questions from each unit. The student is required to attempt five questions in all selecting one question from each unit and Question No. 1 is compulsory.

UNIT-I

Data Analytics: Introduction to Data Analytics, Business Intelligence (BI) for better decisions, Decision types, BI tools, BI skills, BI applications.

Data warehousing: Introduction to Data warehousing (DW), Design considerations for DW, DW development approaches, DW architecture.

Data Mining: Introduction to Data mining, Data cleaning and preparation, outputs of Data mining, evaluation of data mining results, Data Mining Techniques.

UNIT-II

Decision Trees: Introduction to Decision tree, Decision tree problem, Decision tree construction, Lessons from constructing trees, Decision tree algorithms.

Regression: Introduction, Correlations and Relationships, Visual Look at Relationships, Logistic regression, Advantages and disadvantages of regression models.

Artificial Neural Networks: Introduction, business applications of ANN, Design principles of an ANN, Representation of a neural network, Architecting a neural network, Developing an ANN, Advantages and disadvantages of using ANN.

UNIT-III

Cluster analysis: Introduction, Applications of cluster analysis, Definition of a cluster, Representing clusters, Clustering techniques, K-means algorithm for clustering, Selecting the number of clusters.

Association rule Mining: Introduction, Business applications of association rules, Representing association rules, Algorithms for association rule, Apriori algorithm, Creating association rules.

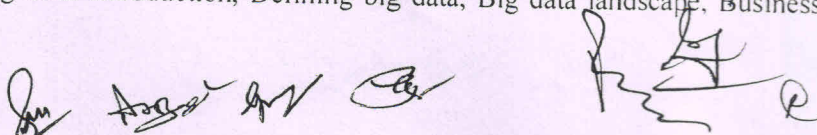
Web Mining: Introduction, Web content mining, Web structure mining, Web usage mining, Web mining algorithms.

UNIT-IV

Naive-base analysis: Introduction, Probability, Naïve base model, Text classification example.

Support vector machines: Introduction, SVM model, The kernel method.

Big data: Introduction, Defining big data, Big data landscape, Business implications of big data, Technology







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implications of big data, Big data technologies, Management of big data.

Suggested Readings

1. Data Analytics by Anil Maheshwari, Mc Graw Hill Education, 2017.
2. Data Analytics for Beginners, Robert J. Woz, Createspace Independent Pub (October 2017)

Note: Latest and additional good books may be suggested and added from time to time.

Jan Anand Woz  
 

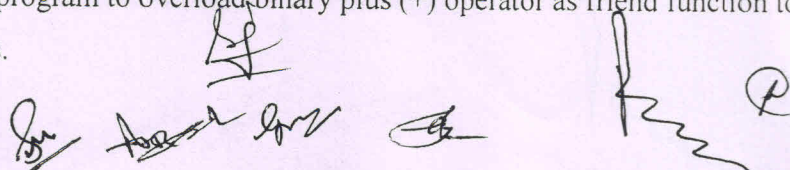
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CCsP- 509
Practical -I: (Computer Science)
Computer Lab--V
(Credits: 02, 60 Hours (4hrs. per week))

Marks: 50 / 50
Time: 3 Hours

List of Experiments Using C++:

1. Write a program to perform different arithmetic operation such as addition, subtraction, division, modulus and multiplication using inline function.
2. Write a program to find area of square, rectangle, circle using function overloading.
3. Define a class to represent an item class with data members as number and cost. Write member functions to read and display the data. Write a main program to test the data.
4. Define a class to represent a bank account with the following members
Data members:
 1. Account holder Name
 2. Account number
 3. Type of account
 4. Balance amount in the accountMember functions:
 1. to assign initial value
 2. To deposit an amount
 3. To withdraw an amount after checking the balance
 4. To display name and balanceWrite a main program to test it.
5. Write a program to explain the concept of static data member.
6. Write a program to explain the concept of static member function.
7. Write a program to swap private data of two different classes using friend function.
8. Define a class for complex number with default, parameterized, copy constructor. Write a program to add two complex numbers using friend function.
9. Define a class string with dynamic constructors. Write a program to concatenate two strings.
10. Write a program to show the order in which objects are created and destroyed using constructor and destructor.
11. Write a program to overload unary minus (-) operator using space class.
12. Write a program to overload binary plus (+) operator as member function to add two complex numbers.
13. Write a program to overload binary plus (+) operator as friend function to add two complex numbers.



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14. Write programs to explain single, multiple, multilevel, hierarchical and hybrid inheritance.
15. Write a program to explain manipulators.

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CCsL- 603
Discipline Specific Course-III (Computer Science)
COMPUTER GRAPHICS
(Credits: 02, 30 Hrs (2Hrs /week))

Marks for Major Test (External): 80 Marks
for Internal Exam: 20
Time: 3 Hours

Paper setter is required to set nine questions in all. Question no. 1 is compulsory and is based on the entire syllabus consisting of eight to ten short answer type questions each of 2 marks. The remaining eight questions are to be set uniformly having two questions from each unit. The student is required to attempt five questions in all selecting one question from each unit and Question No. 1 is compulsory.

UNIT - I

Introduction: Historical perspective of Computer Graphics, Basic elements of Computer graphics (Modelling, Rendering, Animation), Applications of Computer Graphics.

Input Devices: Keyboard, Mouse, Light Pen, Graphic Tablets, Joysticks, Trackball, Flatbed Scanner.

UNIT - II

Hard Copy Devices: Laser Printer, Flatbed Plotters.

Video Display Devices: Pixel, Resolution, Aspect Ratio, Refresh Rate and Interlacing. Cathode Ray Tube, Flat Panel Display-LCD and Plasma Panel. Raster and Random scan display system.

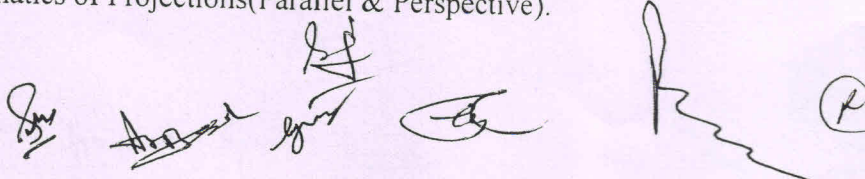
UNIT - III

Fundamental Techniques in Graphics: Line Generation Algorithms-DDA Algorithm, Bresenham's Line Generation Algorithm. Circle Generation Algorithms- Bresenham's Algorithm and Midpoint Circle Algorithm. Polygon Filling Algorithms-Scan Line Algorithm. Viewing & Clipping-Point Clipping and Line Clipping, Cohen-Sutherland Line Clipping Algorithm. Polygon Clipping (Sutherland Hodgman Algorithm)

UNIT - IV

2-Dimensional Graphics: Cartesian and Homogeneous Co-ordinate System, Geometric Transformations (Translation, Scaling, Rotation, Reflection).

3-Dimensional Graphics: Geometric Transformations (Translation, Scaling, Rotation, Reflection), Mathematics of Projections(Parallel & Perspective).



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Suggested Readings:

1. Computer Graphics Principles and Practices second edition by James D. Foley, Andeies van Dam.Stevan.
2. K.Feiner and Johb F. Hughes, 2000, Addision Wesley.
3. Computer Graphics by Donald Hearn and M.Pauline Baker, 2nd Edition, 1999, PHI.
4. Procedural Elements for Computer Graphics – David F. Rogers, 2001, T.M.H Second Edition
5. Introduction to Computer Graphics By N. Krishanmurthy T.M.H 2002

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CCsL- 604
Discipline Specific Course-IV (Computer Science)
PYTHON PROGRAMMING
(Credits: 02, 30 Hrs (2Hrs /week))

Marks for Major Test (External): 80 Marks
for Internal Exam: 20
Time: 3 Hours

Paper setter is required to set nine questions in all. Question no. 1 is compulsory and is based on the entire syllabus consisting of eight to ten short answer type questions each of 2 marks. The remaining eight questions are to be set uniformly having two questions from each unit. The student is required to attempt five questions in all selecting one question from each unit and Question No. 1 is compulsory.

UNIT - I

Introduction to Python: History and Features of Python Programming, Python Interpreter. Variable, identifiers and literal. Token, keywords. Data Types. Arithmetic operators, Relational operators, Logical operators, Bitwise operators, Assignment operators, Membership operators, Identity operators. Operator precedence. Comment, Indentation, Need for indentation

Built-in Functions: input, eval, composition, print, type, round, min and max, pow. Type Conversion, Random Number Generation. Mathematical Functions. Getting help on a function, Assert Statement.

UNIT - II

Control Statements: if Conditional Statement, for and while Statements. break, continue and pass statements.

Functions: Function Definition and Call, Function Arguments-Variable Function Arguments, Default Arguments, Keyword Arguments, Arbitrary Arguments. Command Line Arguments. Global and local Variables. Accessing local variable outside the scope, Using Global and Local variables in same code, Using Global variable and Local variable with same Name.

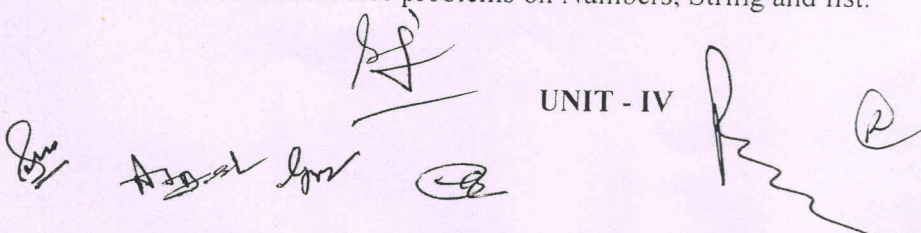
UNIT - III

Strings: String as a compound data type. String operations- Concatenation, Repetition, Membership operation, Slicing operation. String methods-count, find, rfind, capitalize, title, lower, upper, swapcase, islower, isupper, istitle, replace, isalpha, isdigit, isalnum. String Processing examples.

Lists: List operations-multiplication, concatenation, length, indexing, slicing, min, max, sum, membership operator; List functions-append, extend, remove, pop, count, index, insert, sort, reverse.

Recursion: Recursive solutions for problems on Numbers, String and list.

UNIT - IV




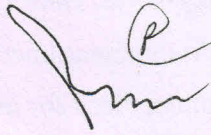
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Object Oriented Programming: Introduction to Classes, Method, Class object, Instance object, Method object. Class as abstract data type, Date Class. Access attributes using functions-getattr, setattr, delattr. Built-In Class Attributes of Class object (`__dict__`, `__doc__`, `__name__`, `module__`).

Graphics: Screen Objects- Point and line, box, polygon, circle, arc. Screen Object Methods- `move_to()`, `move_by()`, `rotate_by()`, `Text()`. Sound- `Sound()`, `play_sound()`, `stop_sound()`.

Suggested Readings:

1. Sheetal Taneja and Naveen Kumar, "Python Programming A modular Approach", Pearson
2. P. K. Sinha & Priti Sinha , "Computer Fundamentals", BPB Publications, 2007.
3. Dr. Anita Goel, "Computer Fundamentals", Pearson Education, 2010.
4. Allen Downey, Jeffrey Elkner, Chris Meyers. How to think like a computer scientist learning with Python / 1st Edition, 2012 .

Dr. Anand Kumar  

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CCsP- 609
Practical –II: (Computer Science)
Computer Lab--VI
(Credits: 02, 60 Hours (4hrs. per week))

Marks: 50
Time: 3 Hours

List of Experiments Using PYTHON:

1. Write a Program to convert decimal number into binary, octal and hexadecimal number system using built-in functions.
2. Write a program to find the H.C.F of two input number using function.
3. Write a program to slice lists.
4. Write a program to change or add elements to a list.
5. Write a program to display calendar of given month of the year.
6. Write a program to compute factorial of a number using recursion.
7. Write a program to reverse the string using recursion.
8. Write a program to create copy of list using recursion.
9. Write a program to implement Bresenham's line drawing algorithm.
10. Write a program to implement mid-point circle drawing algorithm.
11. Write a program to clip a line using Cohen and Sutherland line clipping algorithm.
12. Write a program to clip a polygon using Sutherland Hodgeman algorithm.
13. Write a program to apply various 2D transformations.

Sum *Asst* *for* *(C)* *(P)*
LF *(P)*