UNIVERSITY OF KERALA

COURSE STRUCTURE AND SYLLABI
FOR
CAREER-RELATED FIRST DEGREE PROGRAMME IN
PHYSICS AND COMPUTER APPLICATIONS

UNDER

CHOICE BASED CREDIT & SEMESTER- SYSTEM (CBCS)

(2014 admission onwards)

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I. General Structure for the Career related first degree Programme in Physics & Computer Applications

Sem. No.	Course title	Instructional hours/week		Credit	Uty.Exam duration	Evaluation		Total credit
		L	**P**			Internal	Uty. exam	
I	EN1111.3 English Lang I	5		3	3 hours	25%	75%	
	ML/HN1111.3 Addl Lang I	5		3	,,			
	PC1121 Foun Course (Core)I	3		3	,,			
	Core Course (Lab)		2	-	-			16
	PC1171 Voc Course I	3	2	3	3 hours			
	MM1131.6 Compl. Course I	5		4	,,			
II	EN1211.3 Eng Lang. II	5		3	3 hours			
	ML/HN1211.3 Addl Lang. II	5		3	,,			
	PC1221 Foun Course(Voc) II	3		2	,,			
	PC1241 Core Course I	3		3	,,	,,	,,	21
	PC1242 CoreCourse II(LabI)		2	3	,,			
	MM1231.6 Compl. Course II	5		4	,,			
	PC1271 Voc.Course II(Lab)		2	3	,,			

III	EN1311.3 Eng Lang. III	5		3	3 hours			16
	PC1341 Core Course III	3	4	3	,,			
	PC1371 Voc.Course III	3	-	3	,,	,,	,,	
	PC1372 Voc.Course IV	3	2	3	,,			
	MM1331.6 Compl. Course III	5		4	3 hours			
IV	EN1411.3 Eng Lang. IV	5		3	3 hours			
	PC1441 Core Course IV	3		3	,,			
	PC1442 Core Course V	3		3	,,			26
	PC1443Core. Course VI (Lab II& Proj)	-	2	4	,,	,,	,,	
	PC1471 Voc. Course V	3	-	3	3 hours			
	PC1472 Voc. Course VI	2	-	2	,,			
	PC1473Voc.Course VII (Lab)	-	2	4	,,			
	MM1431.6 Compl. Course IV	5		4	,,			
V	PC1541 Core Course VII	4	-	3	3 hours			
	PC1542 Core Course VIII	4	4	4	,,			
	PC1571 Voc. Course VIII	3	-	3	,,	,,	,,	16
	PC1572 Voc. Course IX -Lab	-	7	4	,,			
	PC1581 Open Course I(Voc)	3		2	3 hours			

Sem	Course							
VI	PC1641 Core Course IX	3	-	3	3 hours			
	PC1642 Core Course X	3	-	3	,,			
	PC1643 Core (lab III) XI		2	3	,,	,,	,,	25
	PC1644 Core (Lab IV) XII		2	3	,,			
	PC1651 Elective (Core)	3		2	,,			
	PC1671 Voc. Course XI	4		4	,,			
	PC1672 Voc. Course XII	4		3	,,			
	PC1673 Project (Voc)		4	4				

II. Course structure: (a). Core Courses (theory)

SEM	TITLE OF PAPER	Number of hours per week	Number of credits	Total hours/ semester	UE Duration	Weightage	
						IA	UE
1	PC 1121- Mechanics & Properties of matter (Foundation Course)	3	3	54	3 hrs	1	3
2	PC1241- Thermodynamics & Statistical Physics	3	3	54	3	1	3
3	PC1341– Electrodynamics	3	3	54	3	1	3
4	PC1441-Classical Mechanics & Theory of Relativity.	3	3	54	3	1	3
	PC1442- Optics	3	3	54	3	1	3
5	PC1541– Electronics	4	3	72	3	1	3
	PC1542–Atomic & Nuclear Physics	4	4	72	3	1	3
6	PC1641-Solid State Physics	3	3	54	3	1	3
	PC1642– Quantum Mechanics	3	3	54	3	1	3
	PC1651– Elective course	3	2	54	3	1	3

(b). COURSE STRUCTURE FOR PRACTICALS AND PROJECT WORK

FOR THE CORE COURSE:

Sem	Title of Paper	Duration of Exam	Number of credits	weightage IA	weightage UE	Allotted hours	
						Per week	Per year
2	PC1242- mechanics, properties of matter, measurements and acoustics	3	3	1	3	S1---2 S2---2	144
4	PC1443– Electricity, Heat & magnetism	3	4	1	3	S3---4 S4—2	144
6	PC1643- Optics & Electronics	3	3	1	3	S5---2 S6—2	144
6	PC1644 – Digital electronics & computer science	3	3	1	3	S5---2 S6—2	144

III. Course structure:(a). Vocational Courses (theory)

SEM	TITLE OF PAPER	Number of hours per week	Number of credits	Total hours/ semester	UE Duration	Weightage	
						IA	UE
1	PC 1171- Introduction to IT	3	3	54	3 hrs	25%	75%
2	PC1221- Introduction to Programming	3	2	54	3	,,	,,
3	PC1371–Operating Systems	3	3	54	3	,,	,,
	PC1372- Data Structures	3	3	54	3	,,	,,
4	PC1471- Software Engineering	3	3	54	3	,,	,,
	PC1472- Object Oriented Programming	2	2	36	3	,,	,,
5	PC1571– Database Management Systems	3	3	54	3	,,	,,
	PC1581-Open Course	3	2	54	3	,,	,,
6	PC1671- Introduction To Information Security	4	4	72	3	,,	,,
	PC1672– Computer Networks	4	3	72	3	,,	,,

(b). COURSE STRUCTURE FOR PRACTICALS AND PROJECT WORK

FOR THE VOCATIONAL COURSE:

Sem	Title of Paper	Duration of Exam	Number of credits	weightage IA	weightage UE	Allotted hours	
						Per week	Per year
2	PC1271- Programming Lab – I	3	3	25%	75%	S1---2 S2---2	144
4	PC1473– Programming Lab – II	3	4	25%	75%	S3---2 S4—2	216
5	PC1572- Programming Lab III	3	4	25%	75%	S5---7	252
6	PC1673 – Major Project & Viva	3	4	25%	75%	S6—4	144

IV. Complementary course (Mathematics)

seme ster	Title of the course	No. of hours/ week	No. of credits	Total hours per sem.	UE duration	weightage IA	UE
1	MM1131.6- Complex numbers, differentiation & theory of equations	5	4	90	3	1	3
2	MM1231.6- Analytic geometry, integration, diff. equations & matrices	5	4	90	3	1	3
3	MM1331.6- Vector differentiation, coordinate systems, abstract algebra and Fourier transforms	5	4	90	3	1	3
4	MM1431.6- Linear transformations, vector integration & complex analysis	5	4	90	3	1	3

III. QUESTION PAPER PATTERN

For all semesters
1. The examination has duration of 3 hours

2. Each question paper has four parts A, B, C & D.

3. Part A contains four bunches each of 4 questions and the candidate has to answer all questions. Each bunch carries weightage of 1. Total time allotted to this part is 30 minutes.

4. Part B contains 12 short answer questions spanning the entire syllabus. Out of this, the candidate has to answer 8 questions. Each question has a weightage of 1. Total time allotted to this part is 40 minutes.

5. Part C contains 8 short essays/problems and the candidate has to answer 5 of them. Each question has a weightage of 2. Total time allotted to this part is 50 minutes.

6. Part D contains 3 long answer questions of which the candidate has to answer 2 questions. Each question has a weightage of 4. Total time allotted to this part is 60 minutes.

IV. Evaluation of problems in the grading system.

Numerical problems in physics shall be graded in the following way.

   i) Correct formula with correct substitution and answer   :   **A grade.**

ii) Correct formula with correct substitution and

    answer but wrong or no unit   :   **B grade.**

iii) Correct formula with correct substitution and wrong answer   :   **C grade.**

iv) Formula alone is correct   :   **D grade.**

   v) Even formula is not correct   :   **E grade.**

V. OPEN/ELECTIVE COURSES

During the programme the students have to undergo two open/elective courses. The students can opt one course from the Physics department (Elective course) and the other from Computer Science department (Open course). The student has to do the open course during the fifth semester and the elective course during the sixth semester. As a beginning, the department will choose one open course for the fifth semester and one elective course for the sixth semester depending on the faculty and infrastructure available.

(a). Open Course

A. Internet Technology

B. Linux Environment

C. Business Informatics

(b). Elective Courses

i) Astronomy & Astrophysics ii) General Meteorology iii) Space Science iv) Photonics v) Nano-material science vi) Computer hardware & networking

VI. CONTINUOUS EVALUATION

There will be continuous evaluation (CE) based on continuous assessment and end semester examination (ESE) for each course. CE carries 25% weightage based on specific components such as attendance, tests, assignments, seminars etc. and ESE carries 75% weightage. Out of the 25% internal assessment, a weightage of 1 shall be given to attendance, weightage of 2 to test papers, weightage of 1 to seminar and weightage of 1 to assignments (minimum two tests & two assignments).The components of the internal evaluation for theory and practical and their weights are given below.

(a). Theory

Component	Weightage
Attendance	1
Assignment	1
Seminar	1
Class tests	2

The continuous evaluation (CE) shall be based on periodic written tests, assignments, viva/ seminar and attendance in respect of theory courses.

Written Tests: Each test paper may have duration of minimum two hours. For each course there shall be a minimum of two written tests during a semester.

Assignments: Each student is required to submit two assignments for a theory course.

Seminar / Viva: For each theory course, performance of a student shall also be assessed by conducting a viva – voce examination or seminar presentation based on topics in that course.

The details of evaluation using the grading system are given in the regulations for UG programmes 2009 of Kerala University.

(b). Continuous Evaluation CE (Practical)

Component	Weightage
Attendance	1
Skill & Punctuality	1
Viva-voce	1
Laboratory record	1
Test (internal exam)	1

Lab skill is to be assessed based on the performance of the student in practical classes. Minimum one practical test paper and an internal viva – voce examination based on the experiments done in the lab are to be conducted in each practical course. The laboratory record should contain an index and a certificate page. Separate records are to be used for each practical course. A candidate shall be permitted to attend an end semester practical examination only if he / she submits a certified bonafide observation book. This is to be endorsed by the examiners.

© **The allotment of grade for attendance shall be as follows.**

	Weightage	Grade	
Attendance	2	90%	Grade A
		< 90% but 85%	Grade B
		< 85% but 80%	Grade C
		< 80% but 75%	Grade D
		< 75%	Grade E

(d) Tests, Assignments and Seminars

For each course there shall be at least two class tests during a semester. Grades for the test in continuous evaluation shall be awarded on the basis of the grades secured for the better of the two tests. Valued answer scripts shall be made available to the students for perusal within 10 working days from the date of the test.

Each student shall be required to do one assignment and one seminar for each course. Valued assignments shall be returned to the students. The seminars shall be organized by the teacher in charge and the same shall be assessed by a group of teachers including the teacher in charge of that course.

VIII. END SEMESTER EXAMINATION (ESE)

The external theory examinations of all semesters shall be conducted by the University. There will be no supplementary examinations. For reappearance/ improvement, as per university rules, the students can appear along with the next batch.

IX. EVALUATION OF PROJECT

The evaluation of project shall be according to the scheme given below.

Component	Weightage
Originality of approach	3
Relevance of the topic	3
Involvement	4
Viva-voce	5
Presentation of report	15

The evaluation of the project shall be done by two external examiners according to the scheme given above. Each candidate shall be evaluated separately. There shall be a maximum of 12 candidates per session with two sessions per day.

However, there shall be no continuous evaluation for the project.

X. EVALUATION OF PRACTICAL EXAMINATION

The practical examinations for the core subject shall be conducted by the University at the end of semesters 2, 4 and 6 with questions set by the University. The examiners shall be selected from a panel of experts prepared by the University. **For each examination centre there shall be two external examiners and one internal examiner who is *not* in charge of the practical at that centre.** The graded score sheet duly certified by the head of the institution should be sent to the University before the commencement of the end semester examinations.

The evaluation scheme for the end semester practical examinations shall be as follows.

Component	Weightage
Formula, circuit, brief procedure	5
Setting and experimental skill	5
Observations and tabulations	10
Substitution, calculation, result	5

For electronics experiments, the scheme shall be as follows.

Component	Weightage
Formula, circuit, brief procedure	8
Observations, skill and tabulations	12
Substitution, calculation, result	5