

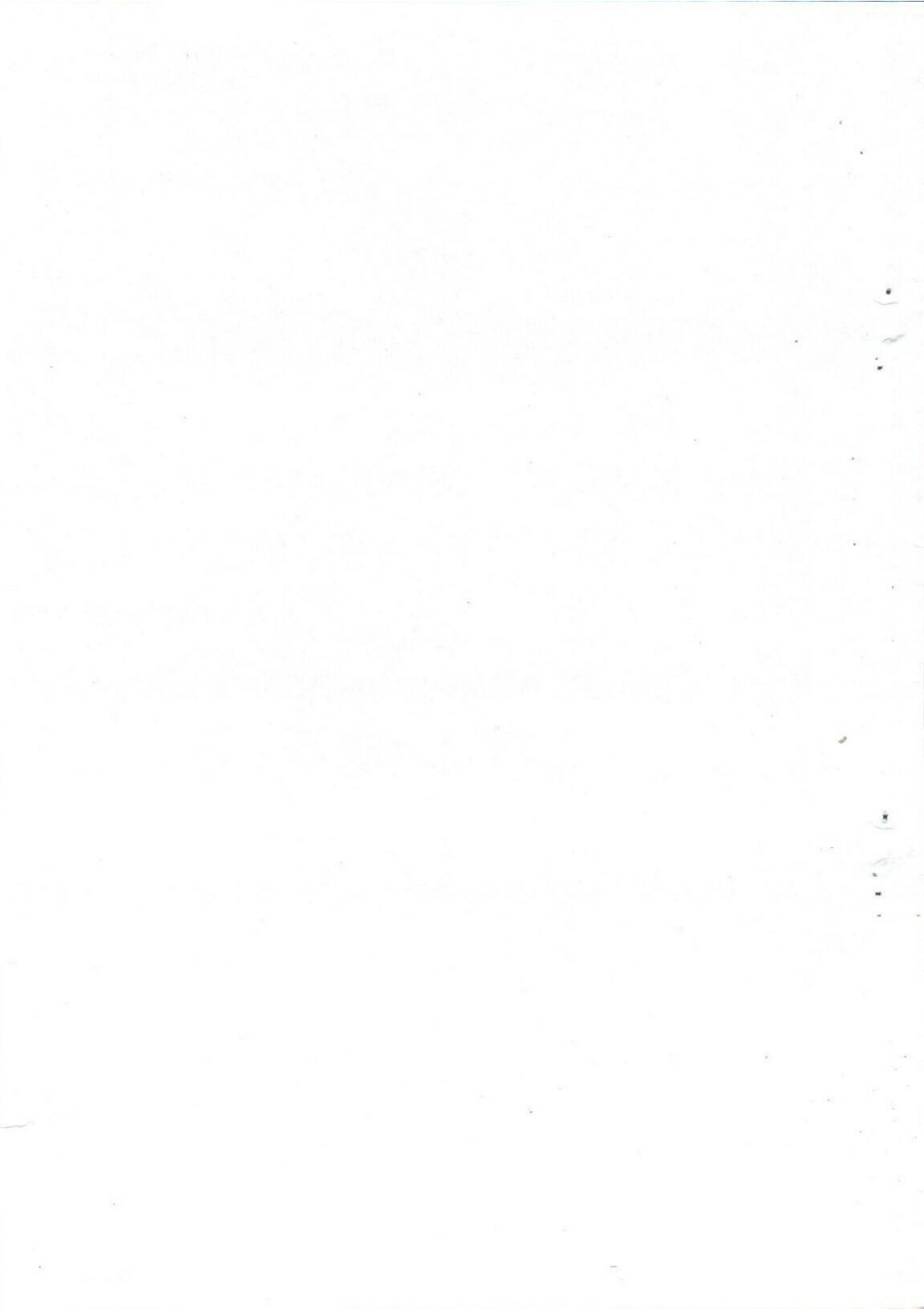
2011-2012
Semester Scheme



BANGALORE UNIVERSITY

I to VI Semester
B.Sc. ELECTRONIC SCIENCE
SYLLABUS

DEPARTMENT OF ELECTRONIC SCIENCE
JNANABHARATHI, BANGALORE-560 056



ಬೆಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾಲಯ
ಜ್ಞಾನಭಾರತಿ, ಬೆಂಗಳೂರು - 560 056.

ಸಂಖ್ಯೆ: ಎಸಿಎ-2/ಎ3/ಸ್ನಾತಕ/ಸಿ.ಪ./ಪರಿಷ್ಕೃತ ಪ.ಕ್ರ/2010-11,

ದಿನಾಂಕ : 06.5.2010

ಅಧಿಸೂಚನೆ

ವಿಷಯ: 2009-10 ಮತ್ತು 2010-11ನೇ ಶೈಕ್ಷಣಿಕ ಸಾಲಿನಿಂದ ಸ್ನಾತಕ ಮತ್ತು ಸ್ನಾತಕೋತ್ತರ ಪದವಿ ಕೋರ್ಸುಗಳಲ್ಲಿ ವಿಜ್ಞಾನ ನಿಖಾಯಕ್ಕೆ ಸಂಬಂಧಿಸಿದ ಸೆಮೆಸ್ಟರ್ ಪದ್ಧತಿಯ ಪರಿಷ್ಕೃತ ಹಾಗೂ ಹೊಸ ಪಠ್ಯಕ್ರಮಗಳನ್ನು ಜಾರಿಗೊಳಿಸುವ ಬಗ್ಗೆ.

- ಉಲ್ಲೇಖ: 1. ದಿನಾಂಕ 06.01.2010ರ ವಿಜ್ಞಾನ ನಿಖಾಯದ ಸಭೆಯ ನಿರ್ಣಯ.
2. ದಿನಾಂಕ 27.03.2010 ರಂದು ನಡೆದ ವಿದ್ಯಾವಿಷಯಕ ಪರಿಷತ್ತಿನ ಸಾಮಾನ್ಯ ಸಭೆಯ ನಿರ್ಣಯ.

* * *

ದಿನಾಂಕ 27.03.2010 ರಂದು ನಡೆದ ವಿದ್ಯಾವಿಷಯಕ ಪರಿಷತ್ತಿನ ಸಾಮಾನ್ಯ ಸಭೆಯಲ್ಲಿ ಕೈಗೊಂಡ ನಿರ್ಣಯದನ್ವಯ ವಿಜ್ಞಾನ ನಿಖಾಯಕ್ಕೆ ಸಂಬಂಧಿಸಿದ ಈ ಕೆಳಕಂಡ ಸ್ನಾತಕ ಮತ್ತು ಸ್ನಾತಕೋತ್ತರ ಪದವಿ ಕೋರ್ಸುಗಳಲ್ಲಿ ಸೆಮೆಸ್ಟರ್ ಪದ್ಧತಿಯ ಪರಿಷ್ಕೃತ ಹಾಗೂ ಹೊಸ ಪಠ್ಯಕ್ರಮಗಳನ್ನು ಅವುಗಳ ಮುಂದೆ ನಮೂದಿಸಿರುವಂತೆ 2009-10 ಮತ್ತು 2010 - 11ನೇ ಶೈಕ್ಷಣಿಕ ಸಾಲಿನಿಂದ ವಿಶ್ವವಿದ್ಯಾಲಯವು ಅಧಿಕೃತವಾಗಿ, ಈ ಮೂಲಕ ಪ್ರಕಟಿಸಿದೆ. ಈ ಪಠ್ಯ ಕ್ರಮಗಳು ಬೆಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾಲಯದ ಅಂಚೆತ್ತೆರವಿನ ಮತ್ತು ದೂರ ಶಿಕ್ಷಣಕ್ಕೆ ಅನ್ವಯಿಸುವುದಿಲ್ಲ.

ಭಾಗ-1

ಕ್ರ.ಸಂ	ಕೋರ್ಸುಗಳ ವಿವರ	ಅನುಮೋದಿಸಿದ ಸೆಮೆಸ್ಟರ್‌ಗಳು	ಅನುಮೋದಿಸಿದ ಹೊಸ/ಪರಿಷ್ಕೃತ ಅಸ್ತಿತ್ವದಲ್ಲಿರುವ ಪಠ್ಯಕ್ರಮಗಳು
1.	Master of Information & Knowledge Management (MIKM)	I to IV Semester	New Courses
2.	P.G.Diploma in Digital Resource Management (PGDDRM) (One Year)	I to II Semester	
3.	P.G Diploma in web Technology (PGDWT) instead of PG Diploma in web Design (One Year)	I to II Semester	
4.	Five year Integrated Course in Biological Sciences	VIII to X Semester	Existing
5.	B.Sc., Genetics	I to VI Semester	Revised
6.	M.Sc., Applied Genetics	I to IV Semester	Revised
7.	B.Sc., Statistics	I to VI Semester	Revised
8.	M.Sc., Statistics	I to IV Semester	Revised

9	M.Sc., Chemistry	I to IV Semester	Revised
10	B.Sc., Zoology	I to VI Semester	Revised
11	M.Sc., Zoology	I to IV Semester	Revised
12	M.Sc., Course in Human Consciousness and Yogic Sciences	I to IV Semester	Revised
13	Bachelor of Speech Language Pathology & Audiology (BSLPA)	I to VI Semester	Revised
14	Master of Audiology & Speech language Pathology (MASLP)	I to IV Semester	Revised
15	M.Sc., Audiology	I to IV Semester	Revised
16	M.Sc., (Speech Language Pathology)	I to IV Semester	Revised
17	M.Sc., Molecular Biology	I to IV Semester	Revised

ಭಾಗ-2

ವಿಶ್ವವಿದ್ಯಾಲಯದ ಅಧಿಸೂಚನೆ ಸಂಖ್ಯೆ : Aca-II/A3/Rev.Syl/UG&PG/2009-10, Dated 23.6.2009 and 6.8.2009 ರಂದು ವಿಶ್ವವಿದ್ಯಾಲಯದಿಂದ ಈ *ಕೆಳಕಂಡ ಪರಿಷ್ಕೃತ ಪಠ್ಯಕ್ರಮಗಳನ್ನು 2009-10ನೇ ಸಾಲಿನಿಂದ ಜಾರಿಗೆ ಬರುವಂತೆ ವಿಜ್ಞಾನ ನಿಖಾಯ ಮತ್ತು ವಿದ್ಯಾವಿಷಯಕ ಪರಿಷತ್ತಿನ ಸಭೆಗಳ ಅನುಮೋದನೆಯನ್ನು ಕಾಯ್ದಿರಿಸಿ ಮೇಲೆ ಸೂಚಿಸಿರುವ ದಿನಾಂಕಗಳಂದು ಅಧಿಸೂಚನೆಯನ್ನು ಹೊರಡಿಸಲಾಗಿತ್ತು. ಅದರಂತೆ ದಿನಾಂಕ 06.01.2010 ರಂದು ನಡೆದ ವಿಜ್ಞಾನ ನಿಖಾಯ ಹಾಗೂ ದಿನಾಂಕ 27.3.2010 ರಂದು ನಡೆದ ವಿದ್ಯಾವಿಷಯಕ ಪರಿಷತ್ತಿನ ಸಭೆಗಳಲ್ಲಿ (ವಿಷಯ ಸಂಖ್ಯೆ : 5) ಮಂಡಿಸಿ, ಅನುಮೋದನೆ ಪಡೆದು ಸ್ಥಿರೀಕರಿಸಲಾಗಿದೆ.

Notification No.ACA-II/A3/Rev.Syl/UG & PG/2009-10, Dated : 23.6.2009

Sl. No.	Name of the Course	Degree	Semester
1	Geology	B.Sc	I to VI
2	Fashion and Apparel Design	B.Sc (FAD)	I to VI
3	Bachelor of Computer Science	BCA	III to VI
4	M.Sc in Life Science	PG	I to IV
5	M.Sc in Chemistry	PG	III Semester Paper C 301 to C-306 Analytical specialization, IV Semester Paper C-401 to C-406 Inorganic specialization
6	Five Year Integrated Course in M.Sc Biological Sciences	Integrated Course	V & VI (Existing)
7	M.Sc in Electronic Media	PG	Paper title of the changed syllabus Paper T - 101, T - 105 T - 203, T - 205, T - 302, T - 304.
8	PG Diploma in Sericulture	PG Diploma	I to VI

9	Home Science a. B.Sc - Composite Home Science b. B.Sc - Clinical Nutrition and Dietetics (UG CND Syllabus) c. B.Sc - Home Science as One Optional d. BA - Home Science as One Optional	UG	
10	M.Sc Electronic Science	PG	Revised Syllabus for one practical paper of M.Sc II Sem (EL-206P)
11	Electronic Science	UG	I to IV
12	Physics	PG	III & IV Specialization in Atmospheric and Space Science.
NO.ACA-II/A3/Rev.Syl/UG & PG/2009-10, Dated : 6.8.2009			
1	M.Sc Geology	I to IV	Revised
2	M.Sc Applied Geology	I to IV	Revised

ಆದೇಶದ ಮೇರೆಗೆ,


ಕುಲಸಚಿವರು

ಗೆ.

ವಿಶ್ವವಿದ್ಯಾಲಯಕ್ಕೆ ಸಂಯೋಜಿತಗೊಂಡಿರುವ ಎಲ್ಲಾ ಕಾಲೇಜುಗಳ ಪ್ರಾಂಶುಪಾಲರುಗಳು ಮೇಲ್ಕಂಡ ಕೋರ್ಸುಗಳ ಪಠ್ಯಕ್ರಮಗಳನ್ನು ವಿದ್ಯಾರ್ಹತಾಪತ್ರ-2 ರಿಂದ ಒಂದು ಪ್ರತಿದ ಮುಖೇನ ಪಡೆಯಬಹುದಾಗಿದೆ.

ಪ್ರತಿಗಳು:

1. ವಿಜ್ಞಾನ ನಿಖಾಯದ ಡೀನರು, ಬೆಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾಲಯ, ಬೆಂಗಳೂರು.
2. ವಿಜ್ಞಾನ ನಿಖಾಯಕ್ಕೆ ಸಂಬಂಧಿಸಿದ ವಿಭಾಗಗಳ ಮುಖ್ಯಸ್ಥರುಗಳಿಗೆ, ಬೆಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾಲಯ, ಬೆಂಗಳೂರು - ಸಂಬಂಧಪಟ್ಟ ಪರಿಷ್ಕೃತ ಪಠ್ಯಕ್ರಮಗಳನ್ನು ವಿಶ್ವವಿದ್ಯಾಲಯದ ಗ್ರಂಥಾಲಯ ವೈಬ್‌ಸೈಟ್‌ನಲ್ಲಿ ಪ್ರಕಟಿಸಲು ಸಾಪ್ತ ಕಾಫಿಯನ್ನು ಗ್ರಂಥಪಾಲಕರಿಗೆ ಒದಗಿಸಲು ಕೋರಲಾಗಿದೆ.
3. ಕುಲಸಚಿವರು (ಮೌಲ್ಯಮಾಪನ), ಬೆಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾಲಯ, ಬೆಂಗಳೂರು.
4. ಸಹಾಯಕ ಕುಲಸಚಿವರು, ವಿದ್ಯಾರ್ಹತಾಪತ್ರ-1, 2, ಮತ್ತು 4, ಬೆಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾಲಯ, ಬೆಂಗಳೂರು.
5. ನಿರ್ದೇಶಕರು, ಅಂಚೆ ತೆರಪಿನ ಮತ್ತು ದೂರಶಿಕ್ಷಣ ನಿರ್ದೇಶನಾಲಯ, ಬೆಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾಲಯ, ಬೆಂಗಳೂರು.
6. ನಿರ್ದೇಶಕರು, ಪ್ರಸಾರಾಂಗ, ಬೆಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾಲಯ, ಬೆಂಗಳೂರು ಮುಂಬರುವ ಗೆಜೆಟ್‌ನಲ್ಲಿ ಪ್ರಕಟಿಸಲು ಕೋರಿದೆ.
7. ಗ್ರಂಥಪಾಲಕರು, ಬೆಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾಲಯ ಗ್ರಂಥಾಲಯ - ಸಂಬಂಧಪಟ್ಟ ಪಠ್ಯಕ್ರಮಗಳನ್ನು ವಿಶ್ವವಿದ್ಯಾಲಯದ ವೆಬ್‌ಸೈಟ್‌ನಲ್ಲಿ ಪ್ರಕಟಿಸಲು ಕೋರಿದೆ.
8. ಕುಲಪತಿಗಳ/ಕುಲಸಚಿವರ ಆಪ್ತಕಾರ್ಯದರ್ಶಿಗಳಿಗೆ, ಬೆಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾಲಯ, ಬೆಂಗಳೂರು.
9. ಸಮನ್ವಯಾಧಿಕಾರಿಗಳು, ಸಂಖ್ಯಾಶಾಸ್ತ್ರ ವಿಭಾಗ, ಬೆಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾಲಯ, ಬೆಂಗಳೂರು.
10. ಕಛೇರಿ ಪ್ರತಿ.

ಬೆಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾಲಯ

ಜ್ಞಾನಭಾರತಿ, ಬೆಂಗಳೂರು - 560 056.

ಸಂಖ್ಯೆ: ಎಸಿಎ-2/ಎ3/ಯು.ಜಿ/ಪಿ.ಜಿ/ಸೆ.ಪ./ವಾ.ಪ/ಪರಿಷ್ಕೃತ ಪ.ಕ್ರ/2011-12

ದಿನಾಂಕ : 11.7.2011

ಅಧಿಸೂಚನೆ

ವಿಷಯ: 2011-12ನೇ ಶೈಕ್ಷಣಿಕ ಸಾಲಿನಿಂದ ವಿಜ್ಞಾನ ನಿಖಾಯಕ್ಕೆ ಸಂಬಂಧಿಸಿದ ಸ್ನಾತಕ ಮತ್ತು ಸ್ನಾತಕೋತ್ತರ ಪದವಿ ಕೋರ್ಸುಗಳಲ್ಲಿನ ಸೆಮೆಸ್ಟರ್ / ವಾರ್ಷಿಕ ಪದ್ಧತಿಯ ಪರಿಷ್ಕೃತ ಪಠ್ಯಕ್ರಮಗಳನ್ನು ಜಾರಿಗೊಳಿಸುವ ಬಗ್ಗೆ.

ಉಲ್ಲೇಖ:1. ದಿನಾಂಕ 21.02.2011ರ ವಿಜ್ಞಾನ ನಿಖಾಯದ ಸಭೆಯ ನಿರ್ಣಯ.

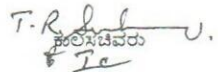
2. ದಿನಾಂಕ 15.06.2011 ರಂದು ನಡೆದ ವಿದ್ಯಾವಿಷಯಕ ಪರಿಷತ್ತಿನ ಸಾಮಾನ್ಯ ಸಭೆಯ ನಿರ್ಣಯ.

* * *

ದಿನಾಂಕ 15.06.2011 ರಂದು ನಡೆದ ವಿದ್ಯಾವಿಷಯಕ ಪರಿಷತ್ತಿನ ಸಾಮಾನ್ಯ ಸಭೆಯಲ್ಲಿ ಕೈಗೊಂಡ ನಿರ್ಣಯದನ್ವಯ ವಿಜ್ಞಾನ ನಿಖಾಯಕ್ಕೆ ಸಂಬಂಧಿಸಿದ ಈ ಕೆಳಕಂಡ ಸ್ನಾತಕ ಮತ್ತು ಸ್ನಾತಕೋತ್ತರ ಪದವಿ ಕೋರ್ಸುಗಳಲ್ಲಿನ ಸೆಮೆಸ್ಟರ್ / ವಾರ್ಷಿಕ ಪದ್ಧತಿಯ ಪರಿಷ್ಕೃತ ಪಠ್ಯಕ್ರಮಗಳು 2011-12ನೇ ಶೈಕ್ಷಣಿಕ ಸಾಲಿನಿಂದ ಜಾರಿಗೆ ಬರುವಂತೆ ವಿಶ್ವವಿದ್ಯಾಲಯವು ಅಧಿಕೃತವಾಗಿ, ಈ ಮೂಲಕ ಪ್ರಕಟಿಸಿದೆ.

ಕ್ರ.ಸಂ	ಕೋರ್ಸುಗಳ ವಿವರ	ಪರಿಷ್ಕೃತಗೊಂಡಿರುವ ಸೆಮೆಸ್ಟರ್ / ವಾರ್ಷಿಕ ಪದ್ಧತಿಯ ಪಠ್ಯಕ್ರಮಗಳು
1. ✓	B.Sc., Electronics	V & VI Semesters
2.	Home Science - With 5 specialization i. M.Sc. in Food & Nutrition ii. M.Sc. in Human Development iii. M.Sc. in Resource Management iv. M.Sc. in Textile and Clothing. v. M.Sc. in Extension Education and Communication	I to IV Semesters
3	M.Sc. Geography	I to IV Semesters
4	P.G. Diploma in Geoinformatics (Self Financing)	Annual Scheme
5	Master of Library & Information Science	I to IV Semesters
6	M.Sc Microbiology	I & II Semesters
7	M.Sc.Biotechnology	I & II Semesters

ಆದೇಶದ ಮೇರೆಗೆ,


 T. R. Subash
 ಕುಲಸಚಿವರು
 ವಿ.ವಿ.

ಗೆ.

ವಿಶ್ವವಿದ್ಯಾಲಯಕ್ಕೆ ಸಂಯೋಜಿತಗೊಂಡಿರುವ ಎಲ್ಲಾ ಕಾಲೇಜುಗಳ ಪ್ರಾಂಶುಪಾಲರುಗಳು ಮೇಲ್ಕಂಡ ಕೋರ್ಸುಗಳ ಪಠ್ಯಕ್ರಮಗಳನ್ನು ವಿದ್ಯಾರ್ಥಿಯೇ-2 ರಿಂದ ಒಂದು ಪ್ರತಿದ ಮುಖೇನ ಪಡೆಯಬಹುದಾಗಿದೆ.

ಪ್ರ.ತಿ.ನೋ.

BANGALORE UNIVERSITY
Department of Electronic Science

Proceedings of Board of Studies (PG/UG) in Electronic Science held on 30th May 2009 at 10.30 am in the Chamber of the Chairman, Department of Electronic Science, J.B. Campus, Bangalore University, Bangalore -560 056.

Members Present		Signature
1. Dr. J.T. Devaraju Dept. of Electronic Science Bangalore University, Bangalore-560 056	Chairman	Sd/-
2. Dr. (Mrs) Jyothi Balakrishnan Dept. of Electronic Science Bangalore University, Bangalore-560 056	Member	Sd/-
3. Prof. Ramanarayanan. V Dept. of Electrical Engineering IISc, Bangalore-560 012.	Member	Absent
4. Prof. P.V. Hunagund Dept. of Applied Electronics Gulbarga University, Gulbarga-585 106.	Member	Sd/-
5. Sri Prakash. C. Patil Dept. of Electronics K.L.E. Societies, S. Nijalingappa College Rajajinagar, IIInd Block, Bangalore-560 010.	Member	Sd/-
6. Sri Mallikarjuna Shetty Dept. of Electronics Vijaya College, R.V. Road Basavanagudi, Bangalore.	Member	Sd/-

The Chairman extended a warm welcome to the members and then the agenda was taken up for discussion.

Agenda Item 1:

Revised syllabus for one practical paper of M.Sc. II Semester (EL 206P) was discussed and approved.

Existing Syllabus: EL 206P: Digital Electronics & Microwave Lab-IV

Revised Syllabus: EL 206P: VHDL Programming, FPGA Implementation and Microwave Lab-IV

Revised Syllabus in Electronics of 1st to 4th semester B.Sc. was discussed and approved.

In response to proposed introduction of Specialization in 5th & 6th semester B.Sc, Board felt that Specialization at UG level is not advisable.

Keeping in view of revision in syllabi for B.Sc. (Electronics), Chairman requested the board to suggest question paper pattern. The board then authorized the chairman to prepare question paper pattern in consultation with syllabus revision committee constituted earlier to revise the syllabus.

Agenda Item 2 & 3:

The recommendation for the BOAE of UG and PG Electronics and the Panel of Examiners for UG & PG were approved.

Agenda Item 4:

The PhD synopsis submitted by Mr. Ravi Kolarkar G entitled *Electrical Switching and Optical Properties of Chalcogenide Thin films* under guidance of Dr. J.T. Devaraju, as a fulfillment for consideration for PhD registration was approved.

Other Items:

Dr. (Mrs.) Jyothi Balakrishnan has requested the Board for recommendation for inclusion of Dr. Lalith Kumar, Director MTRDC, as a co-guide to Mr. Santra working for PhD under her guidance. The Board considered her request and approved.

BANGALORE UNIVERSITY
New Syllabus for B.Sc. (Semester Scheme)

Subject : ELECTRONICS

STRUCTURE OF THE SYLLABUS

Semester Scheme	Number of Hours		Title of the papers
	Teaching	Tutorial	
Semester I	50	15	Basic Electronics – I
Semester II	50	15	Basic Electronics – II
Semester III	50	15	Digital Electronics & C Programming
Semester IV	50	15	Communication
Semester V	50	15	a. Compulsory paper* b. Specialization paper – I*
Semester VI	50	15	a. Compulsory paper* b. Specialization paper – II*

* V & VI Semester compulsory and specialization papers syllabus are not prepared.

Structure as per existing syllabus.

BANGALORE UNIVERSITY

Scheme of instruction and examination for B.Sc. Semester Scheme

SCHEME AND STUCTURE OF THE SYLLABUS

Semester Scheme	Title of the Paper	Number of hours / week / paper		Examination marks / paper			Duration of Examination		Total marks / paper
		Theory	Practical	Theory	Internal Assessment	Practical	Theory	Practical	
Semester I	Basic Electronics – I	4	3	60	10	30	3	3	100
Semester II	Basic Electronics – II	4	3	60	10	30	3	3	100
Semester III	Digital Electronics and C Programming	4	3	60	10	30	3	3	100
Semester IV	Communication	4	3	60	10	30	3	3	100
Semester V	a. Compulsory paper	3	3	60	10	30	3	3	100
	b. Specialization paper-I	3	3	60	10	30	3	3	100
Semester VI	a. Compulsory paper	3	3	60	10	30	3	3	100
	b. Specialization paper-II	3	3	60	10	30	3	3	100

** Scheme as per existing scheme

I SEMESTER
BASIC ELECTRONICS - I (ELT - I)

Unit 1

12 Hrs

Review of Passive Components—R, L & C. Characteristics of AC signal (T , f , V_{rms} , V_{pp} , v & ϕ). AC Circuits: Capacitive & Inductive reactance. Impedance of RC, RL & RLC circuits. RC Circuit – charging & discharging of a capacitor through resistor. RC time constant. Kirchhoffs laws—Statement & Problems related to voltage & current divider. Thevenin's, Maximum Power transfer, Superposition & Norton's theorems - Statement and problems

Unit 2

12 Hrs

Review of P type, N type semiconductors and PN junction. Diode V-I Characteristics. Zener diode – characteristics & Breakdown mechanisms. Rectifiers – HWR, FWR- derivation for ripple factor, efficiency (for FWR only). Filters - Explanation of shunt capacitor filter. Zener diode regulator, Fixed and variable regulators (78xx, 79xx and LM317). Clippers and clampers-shunt type & problems. Tunnel diode, Varactor diode, Photodiode & LED – construction, characteristics & Applications.

Unit 3

10 Hrs

BJT: Construction, working & terminologies. Configurations – CE, CB, CC (mention only). Definition of α , β , γ – Relationship between them. Leakage currents. Study of CE Characteristics - different regions, DC load line, selection of Q point, Hybrid parameters. Transistor as a switch. Transistor biasing – need for Biasing, stability, Different types of biasing-mention only, Voltage divider biasing with problems.

Unit 4

8 Hrs

Classification of amplifiers, Small signal CE-amplifier-Circuit, study of freq response. r_o model for CE configuration, derivation for A_i , Expression & significance of Z_{in} and Z_{out} . CC amplifier circuit & applications. Multistage amplifiers (mention only).

Unit 5

8 Hrs

Number systems: Binary, Hexa decimal–conversion from binary to decimal and vice-versa, Binary to hex and vice-versa. Addition and subtraction of binary numbers and hex numbers. Subtraction using 2's complement, Signed number arithmetic–addition. Mentioning of different types of codes – BCD Code, Gray code, Excess 3 code, ASCII and EBCDIC codes.

Text books :

1. Text book of Applied Electronics, R.S. Sedha, S. Chand and Co. Ltd, 1st edition 2005.
2. Introductory circuit analysis, Robert Boylestad, PHI 5th edition

Reference Books:

1. Electronic Devices and circuit theory, Robert Boylestad and Louis Nashelsky, PHI
2. Basic electronics, B.L. Theraja - S. Chand and Co.
3. Electronics text lab manual, Paul B. Zbar.
4. Electric circuits, Joseph Edminister, Schaums series.
5. Electric circuits Book 1 - Schaums series - Syed. A. Nasar. Mcgrawhill edition.
6. Basic Electronics and Linear circuits, N.N. Bhargava, D.C. Kulshrestha and D.c Gupta-TMH.
7. Electronic devices, David A Bell, Reston Publishing Company/DB Tarapurwala Publ.
8. Electronic Principles, A.P. Malvino-TMH 6th Edition.
9. Electronic devices, applications and Integrated circuits, Mathur, Kulshrestha and Chadha, Umesh Publications

I Semester Practicals (ELP-I)

PART A

- a. Identification of Electronic Components
- b. Familiarization of Measuring instruments - Digital multimeter (DMM) & CRO

PART B

1. Thevenin's Theorem
2. Super position theorem
3. Maximum power transfer theorem
4. Centre tap full wave rectifier without and with filter
5. Diode & Zener diode characteristics
6. Zener diode as a voltage regulator
7. Clippers and clampers (Compulsory)
8. Transistor characteristics CE – mode determination of h-parameters.
9. Design and study voltage divider biasing
10. CE amplifier (Compulsory)
11. CC amplifier (Compulsory)
12. Fixed voltage regulators IC 7805, IC 7812 and IC 7912
13. Variable voltage regulator using IC LM – 317

Note : PART A : Compulsory (Not for Examination) &
PART B : Minimum of 10 experiments to be performed.

II SEMESTER

BASIC ELECTRONICS-II (ELT-II)

Unit 1

12 hours

JFET - Construction, working, characteristics, parameters and their relationships. MOSFET - Types, construction, working & characteristics. JFET amplifier - CS mode, operation and expression for gain A_v . UJT Construction, working, characteristics and relaxation oscillator.

SCR Construction, working, characteristics. Half wave and full wave controlled rectifiers. Diac and Triac-symbol, construction, characteristics and applications.

Unit 2

10 hours

Classification of Power amplifiers and their comparison. Circuit operation and qualitative study of Complementary symmetry Class B push pull power amplifier. Tuned amplifier - single tuned and double tuned amplifier, frequency response & applications.

Differential Amplifier - Circuit configuration, Dual input balanced output.

Operational amplifiers - Block diagram. Definitions of op-amp parameters-input bias current, input offset voltage, output offset voltage, CMRR and Slew rate. Characteristics of ideal and practical op-amps. Mention three different op-amp ICs (741, OP07, LM308, etc), comparison of op-amp ICs with respect to parameters.

Unit 3

14 hours

Feedback - Concept of feedback. Types of feedback- positive & negative feedback, negative feedback configurations (block diagram only). Effect of negative feedback on voltage gain, Z_i , Z_o , BW and Stability. Inverting and Non inverting amplifiers, virtual ground, derivation for A_v in each case.

Op amp applications-Summing amplifier/Adder, averaging amplifier, Scale changer, Subtractor, Integrator and Differentiator-derivation for the output voltage in each case. comparator & Schmitt trigger.

Active filters-low-pass, high-pass-derivation, band-pass (narrow band), band reject and all pass filter (first order only).

Unit 4

14 hours

Oscillators-Basic principle of oscillator, positive feedback, Barkhausen criterion, damped and undamped oscillations, classification of oscillators. Collpitt & Hartley oscillator-using transistor. Phase-shift & Wein bridge oscillator-using Op-amp : construction, working and expression for frequency of oscillations (no derivation). Principle and equivalent circuit of a crystal, construction and working of collpitt crystal oscillator.

Multivibrator - Definition, classification of multivibrators, astable, monostable & bistable multivibrator with relevant equations. (No derivation).

Text books :

1. Text book of Applied Electronics – R.S. Sedha - S. Chand and Co. Ltd., 1st edition 2005.
2. Electronic Devices & circuit theory, Robert Boylestad & Louis Nashelsky-PHI.
3. Operational Amplifier and Linear Integrated circuits - Ramakanth Gayekwad PHI 5th edition

Reference Books:

4. Electronic Devices & circuit theory, Robert Boylestad & Louis Nashelsky-PHI
5. Basic electronics – B.L. Theraja - S. Chand and Co.
6. Electronics text lab manual : Paul B. Zbar.
7. Basic Electronics and Linear circuits : N.N. Bhargava, D.C Kulshresta and D.c Gupta -TMH.
8. Electronic devices : David A Bell – Reston Publishing company / DB Tarapurwala Publ.
9. Electronic Principles : A.P. Malvino -TMH 6th Edition.
10. Electronic devices, applications and Integrated circuits: Mathur, Kulshreshta and Chadha - Umesh Publications

II Semester Practicals (ELP- II)

1. Study of op-amp parameters-CMRR, slew rate, Z_i and Z_o .
2. Inverting and non inverting amplifiers
3. Adder (Inverting / non inverting) and subtractor.
4. Differentiator and Integrator (wave forms).
5. Study of first order low-pass filter and high-pass filter.
6. Band pass filter-narrow band.
7. Hartley oscillator / Collpit oscillator Using transistor
8. RC phase shift oscillator / Wein bridge oscillator Using op-amp.
9. Astable and monostable multivibrators using IC555.
10. FET characteristics
11. UJT characteristics and relaxation oscillator
12. SCR characteristics.
13. FET amplifier- CS mode –Frequency response, Z_i and Z_o

Note: Minimum of 10 experiments to be performed

III SEMESTER

DIGITAL ELECTRONICS AND C PROGRAMMING (ELT-III)

Unit 1

12 hours

Boolean algebra-Introduction, Logic gates- Basic logic gates-AND, OR, NOT, Logic symbol and truth table. Positive and negative logic. Boolean laws. De Morgan's theorem. simplification of Boolean expressions-SOP and POS. Derived logic gates (NAND, NOR, XOR & XNOR). Universal property of NOR and NAND gates. K-map-3 and 4 variable expressions. Pulse characteristics. Logic Families-Classification of digital ICs. Characteristics of logic families. Circuit description of TTL NAND gate with totem pole and open collector. TTL sub families. Circuit description of CMOS inverter, Comparison of TTL and CMOS families.

Unit 2

10 hours

Combinational logic circuits-Half adder, full adder, half subtractor, full subtractor. Two bit comparator. Encoder, Decimal to BCD Priority encoder. Decoder 2:4 using AND gates, 3:8 using NAND gates, BCD to Decimal decoder & BCD to 7 segment decoder. Multiplexer (4:1 using gates) and Demultiplexer (1:4 using gates). D/A Conversion using 4 bit binary weighted resistor circuit and working. Circuit of R-2R ladder-concept only. A/D conversion-characteristics, successive approximation ADC. (Mention the relevant ICs for all).

Unit 3

10 hours

Sequential logic circuits - RS latch, NAND and NOR latches, Flipflops, clocked RS FF, edge triggering and level triggering, D FF and edge triggered J-K FF, T FF, Edge triggered M/S JK flip flop, clear & preset inputs. Registers and counters-4bit serial in serial out, serial in Parallel out, parallel in serial out, parallel in parallel out, applications. Ring counter, Johnson counter and their applications. Asynchronous counters-Logic diagram, Truth table and timing diagrams of 3 bit ripple counter, 3 bit Up-Down asynchronous counter and modified asynchronous counters. Synchronous counter-design using K-maps up to mod-8.

Unit 4

12 hours

C Programming : Introduction, Importance of C, Character set, Tokens, keywords, identifier, constants, basic data types, variables: declaration & assigning values. Arithmetic operators, relational operators, logical operators, assignment operators, increment and decrement operators, conditional operators, bit wise operators, expressions and evaluation of expressions, type cast operator, implicit conversions, precedence of operators. Arrays-concepts, declaration, accessing elements, storing elements, two-dimensional and multi-dimensional arrays. Input-output statements (printf(), scanf() & getch()) and library functions (math and string related functions).

Unit 5

6 hours

Decision making, branching and looping : if, if-else, else-if, switch statement, break, for loop, while loop and do loop. Functions: Defining functions, function arguments and passing, returning values from functions. Structure of C program and example programs.

Text books :

1. Modern Digital Electronics: R.P. Jain, 3rd edition, TMH Publications.
2. Digital Fundamentals : Floyd , CBS Publishers.
3. Programming in ANSI C, Balagurusamy, 2nd edition, TMH.

Reference Books:

4. Digital Logic Computer design : M. Morris Mano, PHI
5. Digital Systems : Ronald J Tocci, PHI
6. Design with TTL ICs, Robert L Morris, TMH

III Semester Practicals (ELP-III)

PART-A

1. Characteristics of logic gates 7400, 7402, 7404, 7406, 7432
2. Study of logic gates using ICs (7404, 7408, 7432, 7402, 7400, 7486, 7410) and study of universal property of NAND and NOR gates.
3. Half adder and Full adder using gates.
4. Half subtractor and full subtractor using gates.
5. Clocked. RS and D FF using IC 7400 and JK FF using IC 7476.
6. D-A converter-Binary weighted resistor.
7. Shift registers-SISO and SIPO.
8. 4 bit ripple counter-7476 and conversion to decade counter.
9. Decimal to BCD encoder, BCD to 7 segment decoder-7447.
10. Comparator-Study of 4 bit magnitude comparator.
11. Decoder (2:4) using AND gates & (3:8) using 74138
12. Realisation of Full adder and Full subtractor using Mux and Decoder.
13. 4:1 MUX & 1:4 Demux using gates and also using ICs (74150, 74154)

PART- B

1. To generate the Fibonacci series up to the given limit N and also print the number of elements in the series.
2. To find minimum and maximum of N numbers.
3. Find the GCD of two integer numbers.
4. Write a program to calculate factorial of a given number.
5. Find all the roots of a quadratic equation $Ax^2 + Bx + C = 0$ for non – zero coefficients A, B and C. Else report error.
6. Calculate the value of $\sin(x)$ and $\cos(x)$ using the series. Also print $\sin(x)$ and $\cos(x)$ value using library function.
7. To generate and print prime numbers up to an integer N.
8. To sort given N numbers in ascending order.
9. To find the sum & difference of two matrices of order MxN and PxQ.
10. To find the product of two matrices of order MxN and PxQ.
11. To find the transpose of given MxN matrix.
12. To find the sum of principle and secondary diagonal elements of the given MxN matrix.

Note : Minimum of 7 experiments to be performed in each part

IV SEMESTER

COMMUNICATION (ELT-IV)

UNIT 1

4 hours

EM spectrum-Propagation of E.M. Waves. Noise-Definition of Noise, Types of noise (internal and external). Definition of signal to noise ratio and noise figure. Types and Equivalent circuit of T-lines, Primary and secondary constants, Reflection co-efficients, VSWR and CSWR.

UNIT 2

12 hours

Modulation-Need for modulation, Types of modulation-AM, FM & PM. Amplitude Modulation-representation, modulation index, Expression for instantaneous voltage. AM Collector modulator. FM definition, modulation index, expression for FM Frequency spectrum (qualitative), Bandwidth requirements, FM generation-Varactor diode Modulator. Block diagram of AM and FM Transmitter-Comparison of AM and FM. Characteristics of Radio receivers-AM Super Heterodyne receiver, Diode and Transistor Detectors, Principle of AGC. FM Super heterodyne Receiver, Pre emphasis and De Emphasis with circuits.

UNIT 3

10 hours

Pulse and digital communication: Introduction – sampling theorem, types-PAM, PWM, PPM, PCM – quantization. Digital communication systems – introduction, Digital modulations (FSK, PSK, and ASK). Advantage and disadvantages of digital transmission, Applications. Characteristics of data transmission circuits – Shannon limit for information capacity, Bandwidth requirements, Data transmission speed, Noise, Cross talk, Echo Suppressors, Distortion and Equalizer.

UNIT 4

12 hours

Satellite Communication: Introduction, satellite orbits, Satellite system - Block diagram of satellite sub systems, up link, down link, cross link, transponders (C-band) (Space segment), ground station (simplified Block diagram of earth station). Multiple access methods -TDMA, FDMA, CDMA, GPS-service's like SPS & PPS.

Optical Fiber Communication: Introduction-Need for OFC. Block diagram of OFC system. Fiber optic cables, Light propagation through fiber. Expression for NA (no derivation). Types of Light sources and Detectors. Losses in OFC. Advantages and Disadvantages of OFC over metallic cables.

UNIT 5

12 hours

Television-Introduction, Scanning, Interlaced scanning, T.V. camera (vidicon) Composite video signal-blanking and synchronizing pulses, vestigial side band transmission. TV systems and standards – comparison between American and European systems. Block diagrams of monochrome TV transmitter and receiver. Basic principles of colour TV, primary and secondary colours, colour combinations, chromo and luminance processing as per PAL system. Colour TV receiver (PAL).

Text books :

1. Electronic Communication, George Kennedy, 3rd edition, TMH.
2. Electronic Communication, Roddy and Coolen, 4th edition, PHI.

Reference Books:

3. Electronic Communications Systems, Wayne Thomasi, 5th edition, Pearson Ed.
4. Digital Communication System : Ronald J Tocci.

IV Semester Practicals (ELP-IV)

1. Amplitude modulator and Amplitude demodulator
2. FM modulator using IC8038
3. Pre - Emphasis and De-Emphasis
4. ASK modulation and demodulator
5. FSK modulation
6. PWM and PPM
7. PAM modulator and demodulator
8. Three way Audio cross over network.
9. PLL using IC565
10. AGC
11. VCO using IC 566
12. Frequency mixer
13. Time Division Multiplexing and de multiplexing
14. Frequency Multiplier
15. Characteristics of OFC

Note: Minimum of 10 experiments to be performed.

V and VI SEMESTER

One compulsory theory paper and one specialization paper + two Practical courses per semester

- V Semester: 1. Compulsory paper (ELT-5)
2. Specialization paper (ELT-6)*

- VI Semester: 1. Compulsory paper (ELT-7)
2. Specialization paper (ELT-8)*

Specialization paper ELT-6 & 8 both shall be from same specialization mentioned below (syllabus to be framed).

Colleges are recommended to select at least two specializations.

***Specialization Areas suggested**

1. Embedded system design.
2. Advanced communication.
3. DSP
4. ASIC design.
5. Biomedical Electronics and Instrumentation.
6. Control systems.
7. Microwaves.
8. Power Electronics etc.



BANGALORE UNIVERSITY

V and VI Semester

B.Sc. ELECTRONIC SCIENCE

SYLLABUS

DEPARTMENT OF ELECTRONIC SCIENCE

JNANABHARATHI, BANGALORE-560 056

BANGALORE UNIVERSITY
DEPARTMENT OF ELECTRONIC SCIENCE

Proceedings of Board of Studies (UG / PG) in Electronic Science held on 9th August 2010 at 11 AM in the Chamber of the Chairman, Department of Electronic Science, J.B. Campus, Bangalore University, Bangalore -560 056

1.	Dr. (Mrs) Jyothi Balakrishnan Dept. of Electronic Science Bangalore University, Bangalore-560 056	Member	Sd/-
2.	Prof. Ramanarayanan.V Dept. of Electrical Engineering IISc, Bangalore-560 012.	Member	Absent
3.	Prof. P.V Hunagund Dept. of Applied Electronics Gulbarga University, Gulbarga-585 106.	Member	Sd/-
4.	Sri Prakash.C. Patil Dept. of Electronics K.L.E. Societies, S. Nijalingappa College Rajajinagar, IIInd Block, Bangalore-560 010.	Member	Sd/-
5.	Sri Mallikarjuna Shetty Dept. of Electronics, Vijaya College R.V. Road, Basavanagudi, Bangalore.	Member	Sd/-
6.	Dr. J.T. Devaraju Dept. of Electronic Science Bangalore University, Bangalore-560 056	Chairman	Sd/-

The Chairman extended a warm welcome to the members and then the agenda was taken up for discussion.

Revised Syllabus in Electronics of 5th and 6th semester B.Sc. were discussed and approved.

The recommendation for the BOAE of UG and PG Electronics and the Panel of Examiners for UG & PG were approved.

The Ph.D. synopsis submitted by Shwetha D entitled *Performance Evaluation of Urban Vehicular Mobility in WiMAX* under guidance of Dr. J.T. Devaraju, as a fulfillment for consideration for Ph.D. registration was approved.

The Ph.D. synopsis of the thesis submitted by Sandhya Kulkarni entitled *Performance Evaluation of the Mobile and Mobile Multi Hop Relay WiMAX MAC layer* under guidance of Dr. J.T. Devaraju, was approved.

The Panel of examiners submitted by the guide Dr. J.T. Devaraju for adjudication of Ph.D. thesis of Sandhya Kulkarni entitled *Performance Evaluation of the Mobile and Mobile Multi Hop Relay WiMAX MAC layer* was approved.

The Panel of examiners submitted by the guide Dr. (Mrs) Jyothi Balakrishnan for adjudication of Ph.D. thesis of Mr. Manjesh entitled *Temperature study of the stator windings of a three phase induction motor operated at low speeds* was approved.

(Sd/-)
(Dr. J.T. Devaraju)
Chairman
Dept. of Electronic Science

BANGALORE UNIVERSITY

B.Sc. Syllabus in Electronics

Semester-V, PAPER V

Communication-II (ELT-V)

UNIT 1: Microwaves

06 hrs

Introduction, Frequency spectrum, Micro wave bands, Characteristic features of microwaves, Applications of microwaves.

Wave guides: Introduction, types, rectangular wave guides, modes-TE and TM, Transverse electromagnetic waves.

Microwave devices: Construction, working and applications of Klystron amplifier, Reflex Klystron and Magnetron. Gunn effect and Gunn diode- working and applications.

UNIT 2: Antennas

12 hrs

Radiation Mechanism, Wire Radiators in space-Resonant Antennas-radiation pattern and current distribution for different lengths, Non Resonant Antenna, Antenna parameters-Gain, Directive gain, Power gain, Bandwidth, Beam width, Polarization, Efficiency, Radiation Resistance, Total effective resistance, Derivation for the Expression of Radiation resistance and Power radiated by Antenna, Ungrounded and Grounded antennas, Effect of antenna height. Antenna couplers, Dipole arrays-Folded dipole, Yagi Antenna-designing (5 elements), Numerical examples wherever applicable.

Qualitative study of Helical antenna, loop Antenna, Parabolic reflector, Horn Antenna and Micro strip Antenna.

UNIT 3: RADAR Systems

09 hrs

RADAR-Principles, Frequencies and Powers used in RADAR, Maximum Unambiguous range, Detailed Block diagram of Pulsed RADAR system, RADAR range equation-Derivation, factors influencing maximum range, effect of ground on RADAR antenna characteristics, Doppler effect, MTI RADAR-Block diagram, CW RADAR-Block diagram, advantages, applications and limitations, FM CW RADAR-Block diagram, Numerical examples wherever applicable.

UNIT 4: Cellular Communication and Wireless LANs

09 hrs

Concept of Cellular mobile communication-cell and cell splitting, frequency bands used in cellular communication, Absolute RF Channel numbers (ARFCN), frequency reuse, Roaming and Hand off, Authentication of the SIM card of the subscribers, IMEI number, Concept of data Encryption, Architecture (Block diagram) of cellular mobile communication network, Qualitative study of GSM and CDMA systems, CDMA technology, CDMA overview, Simplified block diagram of cellular phone Hand set, Comparative study of GSM and CDMA.

Wireless LANs: Major components of Local area Network-Primary characteristics of Ethernet-mobile IP, OSI model, Wireless LAN requirements-concept of Bluetooth, Wi-Fi- and WiMAX.

Semester-V, Practical-V (ELP-V)

(any EIGHT experiments)

1. IF amplifier.
2. Class C tuned amplifier.
3. Balanced Modulator.
4. Study of Sensitivity of an AM radio Receiver.
5. Study of Selectivity and Fidelity of an AM radio Receiver.
6. Band Elimination Filter.
7. Two stage RC coupled Amplifier-Determination of Mid band gain of individual stages, overall gain and the concept of loading effect.
8. Study of switched mode regulator using PWM
9. Characteristics of OFC
10. Frequency multiplier using PLL.

Text Books :

1. Electronic Communication systems, Kennedy & Davis, IVth edition-TATA Mc GRAW hill.
2. Introduction to RADAR systems – Skolnik - Mc Graw- Hill
3. Microwaves – K.C. Guptha- PHI
4. Advanced Electronic Communication systems, Wayne Tomasi – VIth edition, Low priced Edition-Pearson Education.

Reference Books :

1. Electronic Communication systems, Fundamentals through Advanced, Wayne Tomasi - Vth edition-Pearson Education
2. Principles of Communication Engineering-Umesh Sinha-satya Prakashan, New Delhi
3. Advanced Communication systems (communication systems-II)-Dr. Ajay Sharma. Satya Prakashan, New Delhi
4. Wireless Communication and networks by William Stallings - II edition.
5. Wireless communication - D P Agrawal: Thomson learning 2007.
6. Electronic & radio engineering - Terman
7. Principles of communication system - Taub and Schilling.
8. Introduction to Radar systems (McGraw Hill, Koga Kusha Ltd.)
9. Fundamentals of microwave engineering – Collins
10. Fundamentals of microwave engineering, Principles, waveguides, microwave amplifiers and applications-Anoop singh, Seema Verma-PHI
11. Electronic Communications, Dennis Roddy & John Coolen-PHI
12. Hand book of experiments in electronics and communication-Poornachandrarao & Sasikala – Vikas publishing house.

Semester-V, Paper-VI

MICROPROCESSOR and INTERFACING (ELT-VI)

UNIT 1 : Introduction to Microprocessor

10 hrs

Introduction, Applications, Basic block diagram, speed, word size, memory capacity, classification of Microprocessors (mention of different microprocessors)

Microprocessor 8085 : Features, Architecture – Block diagram, Internal registers, Register pairs, Flags, Stack pointer, Program counter, Types of Buses. Multiplexed Address and Data bus, Generation of Control signals, Pin description of 8085.

8085 Instructions - Operation code, Operand & Mnemonics.

Instruction set of 8085, Instruction classification, Addressing modes, Instruction format.

Data transfer Instructions, Arithmetic instructions, Increment & Decrement instructions, Logical instructions, Branch instructions and Machine control instructions.

UNIT 2 : Stack operations and Microprocessor Programming

10 hrs

Stack operations, Subroutine calls and return operations. Delay loops, use of counters, Timing diagrams- Instruction cycle, Machine cycle, T- states, Time delay-Numerical examples.

Programs for Data transfer and Memory operations (direct & indirect addressing), Addition and Subtraction of two 8-bit & 16-bit numbers, Multiplication, Display of smallest / largest number in a given array of numbers, Sorting of numbers in descending / ascending order. Number of 1's and 0's in a given byte, Testing for zero condition. 1's and 2's complements. Verification of truth tables of logic gates, Program to add two n byte numbers, Program to generate Fibonacci series up to the limit, Program to find the factorial of a number, Program to find the GCD of two integer numbers.

UNIT 3 : I/O instructions and Interfacing concepts

10 hrs

I/O instructions and Interrupts in 8085.

Basic interfacing concepts, Compatible ICs of μP 8085, Data transfer, Synchronous I/O data transfer using interrupts.

Memory interfacing-Address decoding, Interfacing RAM and ROM.

Interfacing I/O devices-Input port, Output Port, IN & OUT instructions, Interfacing input devices (interfacing matrix key board-block diagram), Interfacing output devices (LED display interfacing-block diagram).

UNIT 4 : Parallel and Serial Interface

06 hrs

PPI IC 8255 - Features, Pin diagram, Functional block diagram, Ports & their modes.

Serial Interface device - Basic concepts of Serial communication (Synchronous and Asynchronous), Universal receiver and transmitter (USART) IC8251, Block diagram and pin descriptions, control and status registers, programming 8251.

Overview of Intel family microprocessors 8086, 8088, 80186, 286, 386, 486 and Pentium Processors.

Semester-V, Practical-VI (ELP-VI)

8085 Microprocessor programs and Interfacing.

1. Program to add & subtract two 8-bit numbers (with carry)-Binary and BCD.
2. Program to add & Subtract two 16-bit numbers (with carry).
3. Program to multiply two 8-bit numbers.
4. Program to find GCD of two numbers.
5. Program to find the ratio (division) of two 8-bit numbers.
6. Program to find the number of 1's & 0's in a given byte and Program to display the smallest number in a given array of numbers.
7. Program to sort the given array of numbers (descending order) and to find the smallest number.
8. Program to display decimal up counting (00-99).
9. Program to find the solution of the Equation $y = mx + c$.
10. Program to verify the truth table of logic gates.
11. Interfacing 20 keys Matrix Keyboard
12. Interfacing Seven-segment display
13. Interfacing DAC card to convert digital input to equivalent analog output (suggested to use IC DAC 08 and IC 741)
14. Interfacing a stepper motor.

(Any Eight Experiments –Any two Interfacing experiments compulsory)

Text Books:

1. Microprocessor Architecture, Programming and Applications with 8085, Ramesh S. Gaonkar - Wiley Eastern Limited - IV Edition.
2. Fundamentals of Microprocessor & Microcomputer : B. Ram - Danpat Rai Publications.

Reference Books:

1. Introduction to Microprocessor Aditya P. Mathur—THM—3rd Edition
2. Microprocessor and Interfacing- Programming & Hardware, Douglas hall, 2e TMH, 1991
3. Modern Digital Electronics, R.P. Jain—Tata Mc-GRAW hill—2nd Edition.
4. Microprocessor and its Applications - R. Theagarajan, S. Dhanasekaran and S. Dhanapal –New Age International Publishers.
5. Microprocessors and Microcontrollers-B.P. Singh, Galgotia Publications.
6. The intel Microprocessors 8086 / 8088, 80186, 386, 486, architecture, Programming and interfacing – Barry. B. Bray, PHI, New Delhi.
7. Microprocessor Lab Manual- G.T. Swamy - Lakshmi Publications 2006.

Semester-VI, Paper-VII
MICROCONTROLLERS (ELT-VII)

UNIT 1 : Introduction to Microcontrollers

10 hrs

Introduction to Microcontrollers – Basic block diagram, comparison of Microcontroller with Microprocessors, Comparison of 8 bit, 16 bit and 32 bit microcontrollers.

Overview of 8051 series–Comparison of 8051, 8052, 8031.

Other Microcontroller families (Mention only) – Maxim 89C420, 89C440, 89C450

Atmel Corporation AT89C51, AT 89LV51, AT89C1051, AT89C2051, AT89C52.

MICROCONTROLLER 8051 - Architecture - Internal block diagram, Key features of 8051, Pin diagram, Memory organization, Internal RAM memory, Internal ROM, General purpose data memory, special purpose / function registers, External memory.

Counters and timers – 8051 oscillator and clock, program counter, TCON, TMOD, Timer counter interrupts, Timer modes of operation. Input / Output ports and circuits / configurations.

Serial data input / Output – SCON, PCON, Serial data transmission modes.

UNIT 2: 8051 - Interrupts and Instruction set

9 hrs

Interrupts – IE, IP, time flag interrupts, serial port interrupt, external interrupts, Reset, Interrupt control, Interrupt priority, Interrupt destinations & Software generated interrupts.

Addressing modes – Immediate addressing, Register addressing, Direct and Indirect addressing,

Data transfer instructions – internal data move, external data move, code memory read-only data move, Push and Pop and data exchange instructions.

Logical Instructions – Byte level logical operations, Bit level logical operations, Rotate and Swap operations.

Arithmetic Instructions – Flags, Incrementing and Decrementing, Addition, Subtraction, Multiplication and Division, Decimal arithmetic, **Simple Programs using Assembly language.**

UNIT 3: Branching Instructions and 8051 programming in C

9 hrs

Jump and Call instructions – Jump and Call program range, Jumps, Calls and Subroutines, Interrupts and Returns, **Simple Example Programs using Assembly language.**

8051 programming using C: Data types and time delays in 8051C, I/O programming, logic operations, Simple Programs, data conversion programs, accessing code ROM space and data serialization.

Timer / Counter Programming in 8051: Programming 8051 Timers, Counter Programming, programming timers 0 and 1 in 8051 C, Example programs.

UNIT 4: Interfacing with 8051 and overview of PIC microcontrollers

8 hrs

Basic interfacing concepts and the Interrupts Programming: 8051 Interrupts, Programming Timer Interrupts, Programming the External Hardware Interrupts.

Schematic diagrams and basic concepts of Interfacing of 8051 with keyboard, seven segment display, stepper motor, DAC, ADC and Traffic light controller circuits with relevant C-programs.

Core features of PIC microcontrollers, overview of various PIC microcontroller series.

Semester-VI, Practical-VII (ELP-VII)

Experiments on Microcontroller Programming

1. Program to add and subtract two 8-bit numbers.
2. Program to find 2's complement of a 16-bit number.
3. Program to find the sum of N 8-bit numbers.
4. Program to find largest of N numbers.
5. Program to find smallest of N numbers
6. Program to find whether the given data is palindrome.
7. Program to arrange the numbers in ascending order.
8. Program to arrange the numbers in descending order.
9. Program to interchange Two one – byte numbers.
10. Program to interchange N one – byte numbers.

Experiments on Verilog

1. Write code to realize basic and derived logic gates.
2. Half adder, Full Adder, Half Subtractor, Full Subtract or using basic and derived gates.
3. Clocked D FF, T FF and JK FF (with Reset inputs).
4. Multiplexer (4x1, 8x1) and Demultiplexer using logic gates.
5. Decoder (2x4, 3x8), Encoders and Priority Encoders.
6. Design and simulation of a 4 bit Adder.
7. Code converters (Binary to Gray and vice versa).
8. 2 bit Magnitude comparator.
9. 3 bit Ripple counter and decade ripple counter
10. 3 bit Synchronous counter and decade counter.

(Any Twelve Experiments including minimum SIX experiments on Verilog)

Text books:

1. The 8051 Microcontroller: Kenneth J Ayala, 2nd ed. Penram International.
2. The 8051 Microcontroller and Embedded systems- M.A. Mazadi, J.G. Mazadi & R.D. McKinlay - pearson PHI.

Reference books:

1. "Programming and Customizing the 8051 Microcontroller" Predko ;-, TMH
2. Microcontrollers: Architecture, Programming, Interfacing and System Design", RajKamal, "Pearson Education, 2005
3. "Microcontrollers - Theory and Applications", Ajay V. Deshmukh; TMH, 2005
4. "Microcontroller and its applications", Dr. Ramani Kalpathi and Ganesh Raja; Sanguine Technical publishers, Bangalore-2005.
5. Fundamentals of Logic Design with Verilog - Stephen. Brown and Zvonko Vranesic, TMH, 2005.

Semester-VI, Paper-VIII

Electronic Instrumentation and Verilog (ELT-VIII)

UNIT 1: Measurement systems, Transducers & Electronic Instrumentation 12 hrs
Introduction to General measurement system, characteristics, definition-static & dynamic transducers, types – resistive, capacitive and inductive transducers. Strain gauge, LVDT (variable inductive transducers), temperature transducers- thermo couple, thermistors, Ultrasonic temperature transducer, Photoelectric transducers, Pressure transducers-MIC and Loud speaker, Signal conditioning (concept only), Amplifier – chopper Amplifier –carrier amplifier - lock in Amplifier.

UNIT 2: Introduction to Bio-medical instruments 7 hrs
Origin of bio-electric signals, Resting & Action potential - propagation, physiological transducers - active & passive transducer for medical application - diagnostic & Analytical equipments - electrodes for ECG, EEG, and EMG, block diagram of ECG and EEG systems.

UNIT 3: Introduction to Verilog 9 hrs
A Brief History of HDL, Structure of HDL Module, Comparison of VHDL and Verilog Introduction to Simulation and Synthesis Tools, Test Benches.

Verilog: Module, Delays, brief description - data flow style, behavioral style, structural style, mixed design style, simulating design.

Language Elements: Introduction, Keywords, Identifiers, White Space Characters, Comments, format, Integers, reals and strings. Logic Values, Data Types-net types, undeclared nets, scalars and vector nets, Register type, Parameters.

Expressions: Operands, Operators, types of Expressions

Gate level modeling : Introduction, built in Primitive Gates, multiple input gates, Tri-state gates, pull gates, MOS switches, bidirectional switches, gate delay, array instances, implicit nets, Illustrative Examples (both combinational and sequential logic circuits).

UNIT 4: Data flow Modeling and Behavioral Modeling. 8 hrs
Data flow Modeling: Continuous assignment, net declaration assignments, delays, net delays and examples.

Behavioral Modeling: Procedural constructs, timing controls, block statement, procedural assignments, conditional statement, loop statement, procedural continuous assignment, Illustrative Examples

Text books:

1. Instrumentation devices and systems : Rangan, Sarma, Mani, TMH
2. Handbook of biomedical instrumentation: Khandpur R S, TMH
3. "Electronic Instrumentation", H.S. Kalsi, TMH, 2004
4. A Verilog HDL Primer – J. Bhasker, BSP, 2003 II Edition.
5. Verilog HDL-A guide to digital design and synthesis-Samir Palnitkar, Pearson, II edition.
6. Design through Verilog HDL–T.R. Padmanabhan & B. Bala Tripura Sundari, WSE, 2004 IEEE Press.

Reference books

1. Instrumentation Measurement and analysis: Nakra B C, Chaudry K K, TMH
2. Measurement systems applications and design: Doebelin E O, McGraw Hill, 1990.
3. Electron measurements and instrumentation techniques: Cooper W D and Helfric A D, PHI, 1989.
4. Biomedical instrumentation and measurements: Leslie-Cromwell, Fred J Weibell, Erich A Pfeiffer, PHI, 1994.
5. Instrumentation, Measurement & Feedback by Barry Jones, PHI
6. "Electronic Instrumentation and Measurements", David A Bell, PHI / Pearson Education, 2006.
7. Electronics & electrical measurements, A K Sawhney, Dhanpat Rai & Sons, 9th edition.
8. Biomedical Instrumentation - M. Arumugham, Anuraçha Agencies
9. Bio Medical Instrumentation Engineering -- Leslie and Chrónewell.
10. Fundamentals of Logic Design with Verilog – Stephen. Brown and Zvonko Vranesic, TMH, 2005.
11. Digital systems Design using VHDL – Charles H Roth, Jr. Thomson Publications, 2004

Semester-VI, Practical-VIII

PROJECT WORK (ELP-VIII)

- Students in a group, not exceeding THREE, should Design, Fabricate and Assemble ONE Electronic project in their respective colleges. The Department Faculty is required to guide the project work.
- Each student should prepare a report and submit at the time of practical examination duly certified by the concerned Faculty & HOD.
- *Department Faculty shall ensure that the entire project work is carried out in their respective colleges by utilising the practical classes assigned to practical VIII and shall be required to give the Seminar on the project.*

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