Department Of Computer Science and Engineering
Kathmandu University
Dhulikhel, Kavre

Subject: Electronics Engineering I   **Course: EEEG 211**

Level: B.E./B.Sc/B. Tech. 2nd Year/1st Semester   Credit Hours: 3

Objective: *To extend the students' knowledge and skills in the understanding of practical electronic circuits. Concepts and devices covered in earlier courses as well as new devices will be examined in practical circuit applications.*

Syllabus:

Diodes: PN junction characteristics; Diode characteristics; Applications- half wave and full wave rectifiers (including bridge), DC and RMS output, efficiency, smoothing, ripple factor, conduction angle, and RC filtering; Regulation and Zener diode; LED

Bipolar Junction Transistor: Basic operation of PNP and NPN transistor action; CE, CB and CC configurations; CE characteristics; The CE transistor as a switch and simple amplifier; Thermal instability; Biasing arrangements; Load line and operating point; Saturation and cut-off; Non-linear region distortion; Transistor hybrid parameters; Small signal hybrid equivalent circuit

Field Effect Transistor: Junction field effect transistor (JFET): basic operation, characteristics, and parameters; IGFET (MOSFET): basic operation; Depletion and enhancement MOSFETs; FET as amplifier; Biasing; Small signal FET model

Amplifiers: Basic definition of amplification and gain; Use of decibel; Brief overview of amplifier types; Frequency and phase response; CR network model for transfer function; Multistage amplifiers and coupling; Brief introduction to cascaded amplifier, darlington pair, long tail pair and emitter follower and concept of tuned load; Design of simple single stage amplifier; Use of computer simulation packages.

Power Amplifiers: Class A power amplifier, AC load line; Matching transformer load; Efficiency; Choice of transistor; Amplifier classification (A, B, C); Class B push-pull amplifier, complementary pair, crossover distortion; Integrated circuit power amplifiers (one example)

Operational Amplifiers: Basic parameters of ideal operational amplifier; Derivation of gain for basic inverting and non-inverting amplifiers with feedback; Input offset voltage and current, input bias current, common mode rejection ratio, slew rate, full power bandwidth, and unity gain bandwidth; Integration, differentiation, addition, clipping and comparator circuits.

References:

1. Schilling and Belove, Electronic Circuits, McGraw Hill Book Company
2. Robert Boylestad and Louis Nashelsky, Electronic Devices & Circuit Theory 6th Ed, PHI

3. Taub & Schilling, Digital Integrated Electronics, McGraw Hill Book Company
4. Sedra & Smith, Microelectronic Circuits, CBS College Publishing, USA, 1987.
5. R A Gayakwad, Op-Amp and Linear Integrated Circuits, PHI, Delhi, 1993