# Engineering Program

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|---|---|
| **Specialization** | **Common** |
| **Course Number** | **20405111** |
| **Course Title** | **Principles of Communications** |
| **Credit Hours** | **3** |
| **Theoretical Hours** | **3** |
| **Practical Hours** | **0** |

❖ **تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2009/2008**

**وصف المادة الدراسية:**

- Telecommunications link configuration, Frequency spectrum, measuring units and signal parameters, Modulation principles and types (AM, FM, PCM, Delta Modulation), and digital modulation, Transmitters and receivers.

**أهداف المادة الدراسية:**

1. To define electrical telecommunications.
2. To familiarize students with the fundamental concepts and terminology of telecommunications
3. To understand the issues that surrounds the transmission of data, voice, and video.
4. Be able to differentiate between types of analog and digital communications.

**الوصف العام:**

| رقم الوحدة | محتويات الوحدة | اسم الوحدة | الزمن |
|---|---|---|---|
| 1 | **Introduction** | ▪ Telecommunication history<br>▪ Telecommunication Link Configuration<br>▪ Kinds of transmission media<br>▪ Frequency spectrum & Voice signal<br>▪ Telegraph and Television signals<br>▪ Speech signal | **2 Weeks** |
| 2 | **Measuring Units and signal Parameters** | ▪ Power gain and loss<br>▪ The Decibel<br>▪ Absolute power and power level<br>▪ Voltage level<br>▪ Relative power level<br>▪ The Neper Unit<br>▪ Signal amplification & attenuation | **2 Weeks** |
| 3 | **Amplitude Modulation** | ▪ Modulation Principle and types<br>▪ Amplitude Modulation principle<br>▪ Modulation factor (index)<br>▪ AM spectrum<br>▪ Power in AM signal<br>▪ R.M.S value of an AM wave<br>▪ Bandwidth<br>▪ Single-sideband suppressed carrier modulation<br>▪ AM modulators and demodulators<br>▪ Linear modulators<br>▪ CSBSC modulator<br>▪ Cowan modulator<br>▪ AM demodulator<br>▪ Envelope detector | **3 Weeks** |
| 4 | **Frequency Modulation** | ▪ Principles of frequency modulation<br>▪ Relation between the modulation index and peak deviation<br>▪ The FM spectrum<br>▪ FM modulators ( Direct method and | **3 Weeks** |

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|---|---|---|---|
| | | peak deviation)<br>▪ FM demodulators<br>▪ Foster-Seely discriminator<br>▪ FM transmitters and receivers | |
| **5** | **Pulse Modulation** | ▪ Principle of pulse modulation<br>▪ Pulse Amplitude Modulation (PAM)<br>▪ Pulse Width Modulation (PWM)<br>▪ Pulse Position Modulation (PPM)<br>▪ Pulse Code Modulation (PCM)<br>▪ Sampling principle<br>▪ Quantization<br>▪ Coding<br>▪ Delta modulation | **2 Weeks** |
| **6** | **Digital Modulation** | ▪ Amplitude shift key (ASK)<br>▪ Frequency shift key (FSK)<br>▪ Coherent & Incoherent demodulation of FSK signals<br>▪ Phase shift keying (PSK)<br>▪ Levels and diagrams of FSK signals<br>▪ Quadrature Phase Shift Keying (QPSK)<br>▪ Eight-Phase shift keying (8PSK)<br>▪ PSK modulators and demodulators<br>▪ Balanced modulator | **2 Weeks** |
| **7** | **Transmitters & Receivers** | ▪ Radio transmitters.<br>▪ transmitters general block diagram<br>▪ Basic features and characteristics of the transmitter<br>▪ Amplitude modulation transmitters<br>▪ Low-level transmitters<br>▪ Self tuning transmitters<br>▪ Frequency modulation transmitters<br>▪ Continuous wave transmitters<br>▪ Radio receivers<br>▪ Tuned radio receivers<br>▪ The Super heterodyne receiver<br>▪ Frequency Modulation receiver<br>▪ Automatic frequency control AFC | **2 Weeks** |

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**طرق التقييم المستخدمة :**

| | | |
|---|---|---|
| الأول | %20 | |
| الثاني | %20 | |
| أعمال الفصل | %10 | |
| الامتحانات النهائية | %50 | |
| المشروع و الوظائف | | |
| المناقشات وتقديم المحاضرات | | |

**طرق التدريس:**

1. محاضرات
2. مناقشات
3. عروض power point

**الكتب والمراجع:**

1. كراسة الاتصالات / اعداد : كلية الامير فيصل الفنية
2. Communication Electronics, Systems, Circuits and Devices – Forrest Baker
3. Radio Systems for Technicians – DC Green
4. Radio and Electronics for Technicians Engineers – Jacobs
5. Digital Communications - Feher

# Engineering Program

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|---|---|
| **Specialization** | **Common** |
| **Course Number** | **20405112** |
| **Course Title** | **Principles of Communications Lab** |
| **Credit Hours** | **1** |
| **Theoretical Hours** | **0** |
| **Practical Hours** | **3** |

**وصف المادة الدراسية:**

- Amplifiers and Attenuators, Tuned circuits, filters, AM and FM modulation demodulation, demodulation, sampling, PCM, delta modulation.

**أهداف المادة الدراسية:**

1. Characterize and verify the specifications of various communication system building blocks including amplifiers, mixers, detectors, and filters.
2. Design and construct communications subsystems to achieve specified performance.
3. Verify the performance of communications subsystems in accordance with theoretical expectations.
4. Learn and apply correct laboratory technique appropriate to working with high frequency circuitry and instrumentation.

**الوصف العام:**

| رقم التجربة | اسم التجربة | محتويات التجربة | الزمن (اسبوع) |
|---|---|---|---|
| 1 | **Amplifiers and Attenuators** | | **2 Weeks** |
| 2 | **Tuned circuits** | | **2 Weeks** |
| 3 | **Filters** | | **2 Weeks** |
| 4 | **AM Modulation** | ▪ The transistor as an amplitude modulator.<br>▪ Diode balanced modulator.<br>▪ Detection and demodulation. | **2 Weeks** |
| 5 | **Super Heterodyne radio** | | **2 Weeks** |
| 6 | **Frequency modulation and FM detection.** | | **2 Weeks** |
| 7 | **Sampling** | | **Week** |
| 8 | **Pulse code modulation** | | **2 Weeks** |
| 9 | **Delta modulation** | | **Week** |

**طرق التقييم المستخدمة :**

| | | |
|---|---|---|
| التقارير و المشاركة | 30% | |
| الامتحان المتوسط | 20% | |
| الامتحان النهائي | 50% | |
| المشروع و الوظائف<br>المناقشات وتقديم المحاضرات | | |

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**الكتب والمراجع:**

1. كراسة مختبر الاتصالات / اعداد : مدرس المادة

1. Communication Electronics, Systems, Circuits and Devices – Forrest Baker
2. Radio Systems for Technicians – DC Green
3. Radio and Electronics for Technicians Engineers – Jacobs
4. Digital Communications - Feher