**Sana'a University**
**Faculty of Engineering**
**Department: Electrical Engineering**
**Title of the Program: Communication Engineering and Networks**

# Course Specification of Telecommunication Polices and Standards

## I. Course Identification and General Information:

| 1. | Course Title: | Telecommunication Polices and Standards | | | |
|---|---|---|---|---|---|
| 2. | Course Code & Number: | CNE437 | | | |
| 3. | Credit hours: | C.H | | | Total |
| | | Th. | Tu. | Pr. | Tr. | |
| | | 2 | - | - | - | 2 |
| 4. | Study level/ semester at which this course is offered: | Fifth Year/ Second Semester | | | |
| 5. | Pre –requisite (if any): | None. | | | |
| 6. | Co –requisite (if any): | None. | | | |
| 7. | Program (s) in which the course is offered: | Communication Engineering and Networks | | | |
| 8. | Language of teaching the course: | English | | | |
| 9. | Location of teaching the course: | Classes at the Faculty of Engineering | | | |
| 10. | Prepared By: | Asst. Prof. Dr. Nasser H. Almofari | | | |
| 11. | Date of Approval | 2020 | | | |

## II. Course Description:

This course introduces the important regulatory terminologies, the fundamentals of telecommunication standardization and regulation, standards and regulatory bodies, 3GPP, FCC, ITU, IETF, NTT and other bodies besides the telecommunication policy and regulation in Yemen. The standards setting process, regulator types, deregulation and liberalization also will be covered. This course also introduces the spectrum management and regulation, spectrum sharing, licensing procedures unlicensed spectrum access legislation process, the universal service, its rules, policy and acts. Finally, it covers the privacy and security.

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| III. Course Intended learning outcomes (CILOs) of the course | | Referenced PILOs |
|---|---|---|
| a1 | Demonstrate the knowledge and understanding of the telecommunication polices, standards and regulation | A1 |
| a2 | Acquire a knowledge about recent economic issues, polices, acts, competition and regulation of telecommunication service | A3 |
| b1 | Analyze core problems, standards and policies impacting telecommunications and the internet | B2 |
| b2 | Consider economic, social and environmental dimensions in any rules or policies related to telecommunication | B4 |
| c1 | Apply an interdisciplinary framework to critically evaluate efficacy of standards and policy initiatives | C2 |
| d1 | Acquire the ability to write and articulate clear, well-reasoned positions on current policy issues and debates | D4 |

**(A)** Alignment Course Intended Learning Outcomes of Knowledge and Understanding to Teaching Strategies and Assessment Strategies:

| Course Intended Learning Outcomes | Teaching strategies | Assessment Strategies |
|---|---|---|
| a1- Demonstrate the knowledge and understanding of the telecommunication polices, standards and regulation | ▪ Active lectures<br>▪ Interactive class<br>▪ Discussions<br>▪ Exercises and Homework | ▪ Midterm and final written tests.<br>▪ Homework and assignments reports |
| a2- Acquire a knowledge about recent economic issues, polices, acts, competition | ▪ Active lectures<br>▪ Interactive class discussions | ▪ Midterm and final written tests. |

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|---|---|---|
| and regulation of telecommunication service | ▪ Exercises and home works | ▪ Homework and assignments reports |

**(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:**

| Course Intended Learning Outcomes | | Teaching strategies | Assessment Strategies |
|---|---|---|---|
| **b1-** | Analyze and evaluate core problems, standards and policies impacting telecommunications and the internet | ▪ Active lectures<br>▪ Tutorials<br>▪ Interactive class<br>▪ Discussions<br>▪ Exercises and home works | ▪ Midterm and final written tests.<br>▪ Homework and assignments reports |
| **b2-** | Consider economic, social and environmental dimensions in any rules or policies related to telecommunication | ▪ Active lectures<br>▪ Tutorials<br>▪ Interactive class<br>▪ discussions<br>▪ Exercises and home works | ▪ Midterm and final written tests.<br>▪ Homework and assignments reports |

**© Alignment Course Intended Learning Outcomes of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:**

| Course Intended Learning Outcomes | | Teaching strategies | Assessment Strategies |
|---|---|---|---|
| **c1-** | Apply an interdisciplinary framework to critically evaluate efficacy of standards and policy initiatives | ▪ Active lectures<br>▪ Tutorials<br>▪ Interactive class discussions<br>▪ Exercises and home works | ▪ Midterm and final written tests.<br>▪ Homework and assignments reports |

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| (D) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies: | | |
|---|---|---|
| Course Intended Learning Outcomes | Teaching strategies | Assessment Strategies |
| **d1-** Acquire the ability to write and articulate clear, well-reasoned positions on current standards and policy issues | ▪ Presentations<br>▪ Exercises and home works | ▪ Homework and assignments reports |

## IV. Course Content:

### A – Theoretical Aspect:

| Order | Units/Topics List | Learning Outcomes | Sub Topics List | Number of Weeks | Contact hours |
|---|---|---|---|---|---|
| **1.** | Introduction | a1, a2 | ▪ Course structure and requirements<br>▪ Evolution of Communication<br>▪ Important Regulatory Terminologies | 1 | 2 |
| **2.** | Telecom. Standardization overview | a1, a2 | ▪ What is the telecommunication standard?<br>▪ Why we need standardization?<br>▪ Formal telecommunications standards organizations, ITU, ETSI, TIA,<br>▪ 3GPP, IEEE 802.11, BBF, IETF | 2 | 4 |

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| | | | | | |
|---|---|---|---|---|---|
| | | | ▪ ONF The Open Networking Foundation for Software Defined Networking (SDN)<br>▪ ETSI ISG NFV The industrial specification group for Network Functions Virtualization (NFV)<br>▪ oneM2M for machine-to-machine communication.<br>▪ ETSI TC ITS for Intelligent Transportation Systems.<br>▪ Standards Setting Process<br>▪ Standardization and Telecommunication industry in Yemen | | |
| **3.** | Telecom. Policy and regulation overview | a1, a2, b1,c1, d1 | ▪ Telecommunication regulation and policy definitions<br>▪ Reasons for regulations<br>▪ Communications as a "Regulated Industry"<br>▪ Justifications for Regulation<br>▪ Basic Regulatory Tools<br>▪ Types of regulators<br>▪ Deregulation and Liberalization<br>▪ The Challenges of Regulation<br>▪ Levels of Government Regulation Today<br>▪ Regulating for Effective Competition | 2 | 4 |

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|  |  |  | ▪ Government Regulation and Policy in Yemen |  |  |
|---|---|---|---|---|---|
| **4.** | Regulation and Policy Bodies | a1, a2, b1, b2, c1, d1 | ▪ The Federal Communications Commission (FCC)<br>▪ Regulatory Integration Under the 1934 Act<br>▪ The FCC in a Functional Perspective, Command and Control, Rulemaking versus Adjudication, Licensing, Norm Entrepreneur<br>▪ Policies in USA<br>▪ Policies in Japan, NTT, NTT Docomo<br>▪ Telecom. Regulation authority, Rules and acts in Yemen | 2 | 4 |
| **5.** | Spectrum Management | a1, a2, b1, b2, c1, d1 | ▪ Spectrum definition and Characteristics<br>▪ Early Spectrum Regulation<br>▪ Rationales for Regulation<br>▪ An Overview of Spectrum Management<br>▪ Regulatory Tradeoffs and Allotment<br>▪ Models of Spectrum Control<br>▪ Spectrum Policy Task Force Report<br>▪ Implementing Flexibility | 2 | 4 |

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| | | | ▪ Redevelopment of Spectrum to Encourage Innovation in the Use of New Telecommunications Technologies<br>▪ Dedicating Spectrum to Unlicensed Uses<br>▪ Approaches to Unlicensed Access<br>▪ White Spaces<br>▪ Spectrum Sharing<br>▪ Efficient Use of Spectrum Through Elimination of Barriers to the Development of Secondary Markets<br>▪ Spectrum management in Yemen | | |
| **6.** | Legislation and Licensing Process | a1, a2, b1, b2, d1 | ▪ Legislation at glance<br>▪ Effects of deregulation<br>▪ License Renewal<br>▪ License Transfer<br>▪ License Assignment<br>▪ Licensing Case Study<br>▪ Reform of the Licensing Process<br>▪ Initial Assignment by Auction | 1 | 2 |
| **7.** | Telecommunication and Universal service | a1, a2, b1, b2, d1 | ▪ Origins of Universal Service Policy<br>▪ Equity and Efficiency in Subsidizing Universal Service: | 2 | 4 |

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|---|---|---|---|---|---|
| | | | Ramsey Pricing versus Distributional Policy<br>▪ Universal Service After the 1996 Act, Inter-carrier Compensation<br>▪ Broadband Universal Service<br>▪ The IP Transition<br>▪ Regulatory Characterization of Broadband Services<br>▪ Net Neutrality Policy | | |
| **8.** | Privacy and security | a1, a2, b1, b2, c1, d1 | ▪ Online privacy policies<br>▪ Economic of privacy<br>▪ Privacy recommendation<br>▪ NIST Cybersecurity frame work<br>▪ Cybersecurity recommendation<br>▪ Cybersecurity Economic<br>▪ Cybersecurity debate<br>▪ Final review | 2 | 4 |
| **Number of Weeks /and Units Per Semester** | | | | **14** | **28** |

| **V.** | **Teaching strategies of the course:** |
|---|---|
| ▪ Active lectures<br>▪ Interactive class discussions<br>▪ Home works<br>▪ Presentations | |

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## VI. Assignments:

| No | Assignments | Aligned CILOs(symbols) | Week Due | Mark |
|---|---|---|---|---|
| **1.** | Recent Standards for the new technologies in telecommunication | a1, b1, c1, d1 | 4th week | 5 |
| **2.** | Telecom polices and regulations in Yemen and compare it with international polices and regulations | a1, a2, b1, b2, c1, d1 | 6th week | 5 |
| **3.** | Telecom licensing and spectrum management in the era of 5G and IoT | a1, a2, b1, b2, c1, d1 | 9th week | 5 |
| **4.** | International cables for universal service access. (Yemen as case study) | a1, a2, b1, b2, c1, d1 | 13th week | 5 |
| | **Total** | | | **20** |

## VII. Schedule of Assessment Tasks for Students During the Semester:

| No. | Assessment Method | Week Due | Mark | Proportion of Final Assessment | Aligned Course Learning Outcomes |
|---|---|---|---|---|---|
| **1.** | Assignments | 4th,6th,9th,13th | 20 | 20% | a1, a2, b1, b2, c1, d1 |
| **2.** | Midterm exam | 8th | 20 | 20% | a1, a2, b1, b2, c1 |
| **3.** | Final Exam | 16th | 60 | 60% | a1, a2, b1, b2, c1 |
| | **Sum** | | **100** | **100%** | |

## VIII. Learning Resources:

- *Written in the following order: (Author - Year of publication – Title – Edition – Place of publication – Publisher).*

**1- Required Textbook(s) (maximum two ).**

| | | | | |
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|  | 1. Stuart M. Benjamin, and James B. Speta, 2015, "Telecommunications Law and Policy", Fourth edition, North Carolina, Carolina Academic Press. |
|---|---|
| **2- Essential References.** | |
|  | 1. Hitoshi Mitomo, 2020, "Telecommunications Policies of Japan", Singapore, Springer Nature Singapore Pte Ltd. <br> 2. Hank Intven, 2000, "Telecommunication Regulation Handbook: module 1, Overview of Telecommunication Regulation", Washington, DC, USA, World Bank. |
| **3- Electronic Materials and Web Sites *etc*.** | |
|  | 1. https://sites.google.com/a/colorado.edu/davidreed/courses |

| **IX. Course Policies:** | |
|---|---|
| **1.** | **Class Attendance:** <br> - The students should have more than 75% of attendance according to rules and regulations of the faculty. |
| **2.** | **Tardy:** <br> - The students should respect the timing of attending the lectures. They should attend within 15 minutes from starting of the lecture. |
| **3.** | **Exam Attendance/Punctuality:** <br> - The student should attend the exam on time. The punctuality should be implemented according to rules and regulations of the faculty for mid-term exam and final exam. |
| **4.** | **Assignments & Projects:** <br> - The assignment is given to the students after each chapter; the student has to submit all the assignments for checking on time. |
| **5.** | **Cheating:** <br> - If any cheating occurred during the examination, the student is not allowed to continue and he has to face the examination committee for enquires. |

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| **6.** | **Plagiarism:** <br> - If one student attends the exam on another behalf; he will be dismissed from the faculty according to the policy, rules and regulations of the university. |
| **7.** | **Other policies:** <br> - All the teaching materials should be kept out the examination hall and mobile phones are not allowed. <br> - Mutual respect should be maintained between the student and his teacher and also among students. Failing in keeping this respect is subject to the policy, rules and regulations of the university. |

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| **Reviewed By** | **Vice Dean for Academic Affairs and Post Graduate Studies: Asst. Prof. Dr. Tarek A. Barakat** <br> **President of Quality Assurance Unit:   Assoc. Prof. Dr. Mohammed Algorafi** <br> **Name of Reviewer from the Department: Asst. Prof. Dr. Mohammed Al-Suraby** |
| | **Deputy Rector for Academic Affairs Asst. Prof. Dr. Ibrahim AlMutaa** <br> **Assoc. Prof. Dr. Ahmed Mujahed** <br> **Asst. Prof. Dr. Munasar Alsubri** |

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**Sana'a University**
**Faculty of Engineering**
**Department: Electrical Engineering**
**Title of the Program: Communication Engineering and Networks**

# Template for Course Plan of Telecommunication Polices and Standards

| I. Information about Faculty Member Responsible for the Course: | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Name of Faculty Member** | Asst. Prof. Dr. Nasser H. Almofari | **Office Hours** | | | | | |
| **Location& Telephone No.** | Sana'a City 777344970 | **SAT** | **SUN** | **MON** | **TUE** | **WED** | **THU** |
| **E-mail** | almofaryn@gmail.com | | | | | | |

| II. Course Identification and General Information: | | | | | | |
|---|---|---|---|---|---|---|
| **1-** | Course Title: | Telecommunication Polices and Standards | | | | |
| **2-** | Course Number & Code: | CNE437 | | | | |
| **3-** | Credit hours: | C.H | | | | Total |
| | | Th. | Tu | Pr. | Tr. | |
| | | 2 | - | - | - | 2 |
| **4-** | Study level/year at which this course is offered: | Fifth Year/ Second Semester | | | | |
| **5-** | Pre –requisite (if any): | None. | | | | |
| **6-** | Co –requisite (if any): | None. | | | | |
| **7-** | Program (s) in which the course is offered | Communication Engineering and Networks | | | | |
| **8-** | Language of teaching the course: | English | | | | |
| **9-** | System of Study: | Regular | | | | |
| **10-** | Mode of delivery: | Semesters | | | | |
| **11-** | Location of teaching the course: | Classes at the Faculty of Engineering | | | | |

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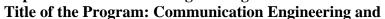
## III. Course Description:

This course introduces the important regulatory terminologies, the fundamentals of telecommunication standardization and regulation, standards and regulatory bodies, 3GPP, FCC, ITU, IETF, NTT and other bodies besides the telecommunication policy and regulation in Yemen. The standards setting process, regulator types, deregulation and liberalization also will be covered. This course also introduces the spectrum management and regulation, spectrum sharing, licensing procedures unlicensed spectrum access legislation process, the universal service, its rules, policy and acts. Finally, it covers the privacy and security.

## IV. Intended learning outcomes (ILOs) of the course:

- Brief summary of the knowledge or skill the course is intended to develop:

1- Demonstrate the knowledge and understanding of the telecommunication polices, standards and regulation
2- Acquire a knowledge about recent economic issues, polices, acts, competition and regulation of telecommunication service
3- Analyze and evaluate core problems, standards and policies impacting telecommunications and the internet
4- Consider economic, social and environmental dimensions in any rules or policies related to telecommunication
5- Apply an interdisciplinary framework to critically evaluate efficacy of standards and policy initiatives
6- Acquire the ability to write and articulate clear, well-reasoned positions on current policy issues and debates

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**Faculty of Engineering**
**Department: Electrical Engineering**
**Title of the Program: Communication Engineering and Networks**

| | V. Course Content: | | | |
|---|---|---|---|---|
| | A – Theoretical Aspect: | | | |
| Order | Units/Topics List | Sub Topics List | Number of Weeks | Contact hours |
| 1. | Introduction | ▪ Course structure and requirements<br>▪ Evolution of Communication<br>▪ Important Regulatory Terminologies | 1st | 2 |
| 2. | Telecom. Standardization overview | ▪ What is the telecommunication standard?<br>▪ Why we need standardization?<br>▪ Formal telecommunications standards organizations, ITU, ETSI, TIA,<br>▪ 3GPP, IEEE 802.11, BBF, IETF<br>▪ ONF The Open Networking Foundation for Software Defined Networking (SDN)<br>▪ ETSI ISG NFV The industrial specification group for Network Functions Virtualization (NFV)<br>▪ oneM2M for machine-to-machine communication.<br>▪ ETSI TC ITS for Intelligent Transportation Systems.<br>▪ Standards Setting Process<br>▪ Standardization and Telecommunication industry in Yemen | 2nd,3rd | 4 |

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|---|---|---|---|---|
| 3. | Telecom. Policy and regulation overview | ▪ Telecommunication regulation and policy definitions<br>▪ Reasons for regulations<br>▪ Communications as a "Regulated Industry"<br>▪ Justifications for Regulation<br>▪ Basic Regulatory Tools<br>▪ Types of regulators<br>▪ Deregulation and Liberalization<br>▪ The Challenges of Regulation<br>▪ Levels of Government Regulation Today<br>▪ Regulating for Effective Competition<br>▪ Government Regulation and Policy in Yemen | 4$^{th}$,5$^{th}$ | 4 |
| 4. | Regulation and Policy Bodies | ▪ The Federal Communications Commission (FCC)<br>▪ Regulatory Integration Under the 1934 Act<br>▪ The FCC in a Functional Perspective, Command and Control, Rulemaking versus Adjudication, Licensing, Norm Entrepreneur<br>▪ Policies in USA<br>▪ Policies in Japan, NTT, NTT Docomo<br>▪ Telecom. Regulation authority, Rules and acts in Yemen | 6$^{th}$,7$^{th}$ | 4 |
| 5. | Midterm Exam | ▪ All previous topics | 8$^{th}$ | 2 |
| 6. | Spectrum Management | ▪ Spectrum definition and Characteristics<br>▪ Early Spectrum Regulation<br>▪ Rationales for Regulation<br>▪ An Overview of Spectrum Management | 9$^{th}$,10$^{th}$ | 4 |

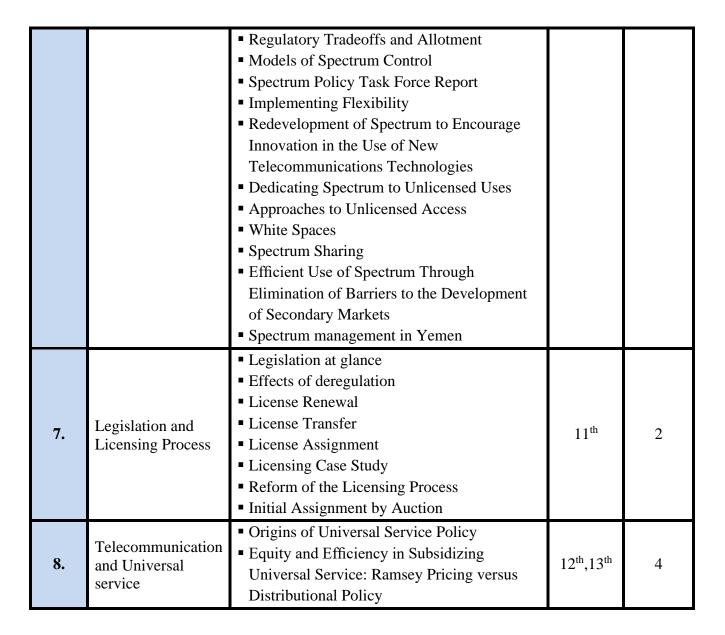| Prepared by<br>Asst. Prof. Dr. Nasser H. Almofari | Head of Department<br>Asst. Prof. Dr. Adel Ahmed Al-Shakiri | Quality Assurance Unit<br>Assoc. Prof. Dr. Mohammad Algorafi | Dean of the Faculty<br>Prof. Dr. Mohammed AL-Bukhaiti | Academic Development Center & Quality Assurance<br>Assoc. Prof. Dr. Huda Al-Emad |
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|---|---|---|---|---|
| | | ▪ Regulatory Tradeoffs and Allotment<br>▪ Models of Spectrum Control<br>▪ Spectrum Policy Task Force Report<br>▪ Implementing Flexibility<br>▪ Redevelopment of Spectrum to Encourage Innovation in the Use of New Telecommunications Technologies<br>▪ Dedicating Spectrum to Unlicensed Uses<br>▪ Approaches to Unlicensed Access<br>▪ White Spaces<br>▪ Spectrum Sharing<br>▪ Efficient Use of Spectrum Through Elimination of Barriers to the Development of Secondary Markets<br>▪ Spectrum management in Yemen | | |
| 7. | Legislation and Licensing Process | ▪ Legislation at glance<br>▪ Effects of deregulation<br>▪ License Renewal<br>▪ License Transfer<br>▪ License Assignment<br>▪ Licensing Case Study<br>▪ Reform of the Licensing Process<br>▪ Initial Assignment by Auction | 11th | 2 |
| 8. | Telecommunication and Universal service | ▪ Origins of Universal Service Policy<br>▪ Equity and Efficiency in Subsidizing Universal Service: Ramsey Pricing versus Distributional Policy | 12th,13th | 4 |

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|---|---|---|---|---|
| | | ▪ Universal Service After the 1996 Act, Inter-carrier Compensation<br>▪ Broadband Universal Service<br>▪ The IP Transition<br>▪ Regulatory Characterization of Broadband Services<br>▪ Net Neutrality Policy | | |
| 9. | Privacy and security | ▪ Online privacy policies<br>▪ Economic of privacy<br>▪ Privacy recommendation<br>▪ NIST Cybersecurity frame work<br>▪ Cybersecurity recommendation<br>▪ Cybersecurity Economic<br>▪ Cybersecurity debate<br>▪ Final review | 14th,15th | 4 |
| 10. | Final Exam | ▪ All topics | 16th | 2 |
| **Number of Weeks /and Units Per Semester** | | | **16** | **32** |

## VI. Teaching strategies of the course:

- ▪ Active lectures
- ▪ Interactive class discussions
- ▪ Home works
- ▪ Presentations

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## VII. Assignments:

| No | Assignments | Aligned CILOs(symbols) | Week Due | Mark |
|---|---|---|---|---|
| 1. | Recent Standards for the new technologies in telecommunication | a1, b1, c1, d1 | 4th week | 5 |
| 2. | Telecom polices and regulations in Yemen and compare it with international polices and regulations | a1, a2, b1, b2, c1, d1 | 6th week | 5 |
| 3. | Telecom licensing and spectrum management in the era of 5G and IoT | a1, a2, b1, b2, c1, d1 | 9th week | 5 |
| 4. | International cables for universal service access. (Yemen as case study) | a1, a2, b1, b2, c1, d1 | 13th week | 5 |
| | **Total** | | | **20** |

## VIII. Schedule of Assessment Tasks for Students During the Semester:

| No. | Assessment Method | Week Due | Mark | Proportion of Final Assessment |
|---|---|---|---|---|
| 1. | Assignments | 4th,6th,9th,13th | 20 | 20% |
| 2. | Midterm exam | 8th | 20 | 20% |
| 3. | Final Exam | 16th | 60 | 60% |
| | **Sum** | | **100** | **100%** |

## IX. Learning Resources:

- *Written in the following order: (Author - Year of publication – Title – Edition – Place of publication – Publisher).*

**1- Required Textbook(s) (maximum two ).**

| | |
|---|---|
| | 1. Stuart M. Benjamin, and James B. Speta, 2015, "Telecommunications Law and Policy", Fourth edition, North Carolina, Carolina Academic Press. |

| Prepared by | Head of Department | Quality Assurance Unit | Dean of the Faculty | Academic Development |
|---|---|---|---|---|
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| 2- Essential References. | |
|---|---|
| | 1. Hitoshi Mitomo, 2020, "Telecommunications Policies of Japan", Singapore, Springer Nature Singapore Pte Ltd. |
| | 2. Hank Intven, 2000, "Telecommunication Regulation Handbook: module 1, Overview of Telecommunication Regulation", Washington, DC, USA, World Bank. |
| **3- Electronic Materials and Web Sites *etc*.** | |
| | 1. https://sites.google.com/a/colorado.edu/davidreed/courses |

## X.    Course Policies:

| | |
|---|---|
| **1.** | **Class Attendance:**<br>- The students should have more than 75% of attendance according to rules and regulations of the faculty. |
| **2.** | **Tardy:**<br>- The students should respect the timing of attending the lectures. They should attend within 15 minutes from starting of the lecture. |
| **3.** | **Exam Attendance/Punctuality:**<br>- The student should attend the exam on time. The punctuality should be implemented according to rules and regulations of the faculty for mid-term exam and final exam. |
| **4.** | **Assignments & Projects:**<br>- The assignment is given to the students after each chapter; the student has to submit all the assignments for checking on time. |
| **5.** | **Cheating:**<br>- If any cheating occurred during the examination, the student is not allowed to continue and he has to face the examination committee for enquires. |

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| **6.** | **Plagiarism:**<br>- If one student attends the exam on another behalf; he will be dismissed from the faculty according to the policy, rules and regulations of the university. |
| **7.** | **Other policies:**<br>- All the teaching materials should be kept out the examination hall and mobile phones are not allowed.<br>- Mutual respect should be maintained between the student and his teacher and also among students. Failing in keeping this respect is subject to the policy, rules and regulations of the university. |

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