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| <br><b>OSTİM TEKNİK<br/>ÜNİVERSİTESİ</b><br>A N K A R A | <b>FACULTY OF ENGINEERING<br/>COURSE SYLLABUS FORM</b> | Doküman No      | MF.FR.003  |
|                                                                                                                                          |                                                        | Revizyon Tarihi | 13.11.2024 |
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| SENG 364 – E-Signature Technologies |                          |     |        |                                                                                                          |
|-------------------------------------|--------------------------|-----|--------|----------------------------------------------------------------------------------------------------------|
| Course Code                         | Course Name              |     |        | Semester                                                                                                 |
| SENG 364                            | E-Signature Technologies |     |        | Fall <input type="checkbox"/> Spring <input checked="" type="checkbox"/> Summer <input type="checkbox"/> |
| Hours                               |                          |     | Credit | ECTS                                                                                                     |
| Theory                              | Practice                 | Lab | 3      | 5                                                                                                        |
| 3                                   | 0                        | 0   |        |                                                                                                          |

| Course Details              |                                                                                                                                                                                                                                                                                                                   |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Department                  | SoftW                                                                                                                                                                                                                                                                                                             |
| Course Language             | English                                                                                                                                                                                                                                                                                                           |
| Course Level                | Undergraduate <input checked="" type="checkbox"/> Graduate <input type="checkbox"/>                                                                                                                                                                                                                               |
| Mode of Delivery            | Face to Face <input type="checkbox"/> Online <input type="checkbox"/> Hybrid <input checked="" type="checkbox"/>                                                                                                                                                                                                  |
| Course Type                 | Compulsory <input type="checkbox"/> Elective <input type="checkbox"/>                                                                                                                                                                                                                                             |
| Course Objectives           | To equip students with both theoretical and practical knowledge on e-signature technologies, including coding and integration processes. By the end of the course, students will be well-prepared to meet industry demands and become highly skilled professionals.                                               |
| Course Content              | The role of e-signatures in projects such as e-invoice, e-prescription, e-correspondence, e-ledger, registered electronic mail, and e-archive<br>The structure and functioning of e-signature technology in light of ETSI standards and RFCs. Software development processes with real-world application examples |
| Course Method/ Techniques   | Lecture <input checked="" type="checkbox"/> Question & Answer <input checked="" type="checkbox"/> Presentation <input checked="" type="checkbox"/> Discussion <input checked="" type="checkbox"/>                                                                                                                 |
| Prerequisites/ Corequisites |                                                                                                                                                                                                                                                                                                                   |
| Work Placement(s)           |                                                                                                                                                                                                                                                                                                                   |

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### Textbook/References/Materials

- ETSI EN 319 122-1
- RFC 3852
- RFC 5280
- RFC 6960
- RFC 3161
- EN 319 132-1

### Course Category

|                                |                                     |  |            |                          |
|--------------------------------|-------------------------------------|--|------------|--------------------------|
| Mathematics and Basic Sciences | <input type="checkbox"/>            |  | Education  | <input type="checkbox"/> |
| Engineering                    | <input checked="" type="checkbox"/> |  | Science    | <input type="checkbox"/> |
| Engineering Design             | <input type="checkbox"/>            |  | Health     | <input type="checkbox"/> |
| Social Sciences                | <input type="checkbox"/>            |  | Profession | <input type="checkbox"/> |

### Weekly Schedule

| No | Topics                                                                                                                                                                                                                                                                                                                                                                                                                                        | Materials/Notes |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| 1  | <ul style="list-style-type: none"> <li>• Mathematics &amp; Cryptography <ul style="list-style-type: none"> <li>○ Introduction To Cryptography</li> <li>○ Introduction to Number Theory</li> <li>○ Divisibility</li> <li>○ Primality</li> <li>○ Euclidean Algorithm</li> <li>○ Congruences</li> <li>○ Euler Theorem</li> <li>○ Primality</li> <li>○ Euclidean Algorithm</li> <li>○ Congruences</li> <li>○ Euler Theorem</li> </ul> </li> </ul> |                 |
| 2  | <ul style="list-style-type: none"> <li>• RSA Crypto System <ul style="list-style-type: none"> <li>○ Key Generation</li> <li>○ Encryption/Decryption</li> <li>○ RSA Based Digital Signature</li> <li>○ Security Parameters</li> <li>○ Plain RSA Issues and Padding</li> </ul> </li> </ul>                                                                                                                                                      |                 |
| 3  | <ul style="list-style-type: none"> <li>• PKI <ul style="list-style-type: none"> <li>○ Digital Certificate</li> <li>○ Certificate Revocation List (CRL)</li> <li>○ Online Certificate Status Protocol (CSP)</li> <li>○ Time Stamp Protocol</li> <li>○ Certificate Path Validation Process</li> </ul> </li> </ul>                                                                                                                               |                 |

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|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| 4  | Implementation / Presentation                                                                                                                                                                                                                                                                       |  |
| 5  | <ul style="list-style-type: none"> <li>Introduction to Abstract Syntax Notation 1 (ASN.1) <ul style="list-style-type: none"> <li>ASN Basic Types</li> <li>ASN Structured Types</li> <li>DER Encoding</li> <li>ASN.1 Presentation of Digital Certificate</li> </ul> </li> </ul>                      |  |
| 6  | <ul style="list-style-type: none"> <li>RSA Crypto System <ul style="list-style-type: none"> <li>Key Generation</li> <li>Encryption/Decryption</li> <li>RSA Based Digital Signature</li> <li>Security Parameters</li> <li>Plain RSA Issues and Padding</li> </ul> </li> </ul>                        |  |
| 7  | Implementation / Presentation                                                                                                                                                                                                                                                                       |  |
| 8  | Midterm Exam                                                                                                                                                                                                                                                                                        |  |
| 9  | <ul style="list-style-type: none"> <li>PKI <ul style="list-style-type: none"> <li>Digital Certificate</li> <li>Certificate Revocation List (CRL)</li> <li>Online Certificate Status Protocol (CSP)</li> <li>Time Stamp Protocol</li> <li>Certificate Path Validation Process</li> </ul> </li> </ul> |  |
| 10 | Implementation / Presentation                                                                                                                                                                                                                                                                       |  |
| 11 | <ul style="list-style-type: none"> <li>Introduction to Abstract Syntax Notation 1 (ASN.1) <ul style="list-style-type: none"> <li>ASN Basic Types</li> <li>ASN Structured Types</li> <li>DER Encoding</li> <li>ASN.1 Presentation of Digital Certificate</li> </ul> </li> </ul>                      |  |
| 12 | Implementation / Presentation                                                                                                                                                                                                                                                                       |  |
| 13 | <ul style="list-style-type: none"> <li>ETSI Digital Signature Standards <ul style="list-style-type: none"> <li>ETSI TS 101 733 (CAAdES)</li> <li>ASN.1 presentation of CAAdES</li> <li>ETSI TS 101 903 (XAAdES)</li> <li>ETSI TS 102 778 (PAAdES)</li> </ul> </li> </ul>                            |  |
| 14 | <ul style="list-style-type: none"> <li>SSL <ul style="list-style-type: none"> <li>SSL Authentication</li> <li>CA/Browser Forum Baseline Requirements</li> <li>DV SSL</li> </ul> </li> </ul>                                                                                                         |  |

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|    | <ul style="list-style-type: none"> <li>○ OV SSL</li> <li>○ CA/Browser Forum EV Guidelines</li> <li>○ EV SSL</li> </ul> |  |
| 15 | Implementation / Presentation                                                                                          |  |
| 16 | Final Exam                                                                                                             |  |

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| <b>Assessment Methods and Criteria</b>                          |                 |                   |
|-----------------------------------------------------------------|-----------------|-------------------|
| <b>In-term studies</b>                                          | <b>Quantity</b> | <b>Percentage</b> |
| Attendance                                                      |                 |                   |
| Lab                                                             |                 |                   |
| Practice                                                        |                 |                   |
| Fieldwork                                                       |                 |                   |
| Course-specific internship                                      |                 |                   |
| Quiz/Studio/Criticize                                           |                 |                   |
| Homework                                                        |                 |                   |
| Presentation / Seminar                                          |                 |                   |
| Project                                                         | 1               | 40%               |
| Report                                                          |                 |                   |
| Seminar                                                         | 1               | 10%               |
| Midterm Exam                                                    |                 |                   |
| Final Exam                                                      | 1               | 50%               |
| <b>Total</b>                                                    |                 | <b>100%</b>       |
| <b>Contribution of Midterm Studies to Success Grade</b>         |                 |                   |
| <b>Contribution of End of Semester Studies to Success Grade</b> |                 |                   |
| <b>Total</b>                                                    |                 | <b>100%</b>       |

| <b>ECTS Allocated Based on Student Workload</b> |                 |                       |                       |
|-------------------------------------------------|-----------------|-----------------------|-----------------------|
| <b>Activities</b>                               | <b>Quantity</b> | <b>Duration (Hrs)</b> | <b>Total Workload</b> |
| Course Hours                                    |                 |                       |                       |
| Lab                                             |                 |                       |                       |
| Practice                                        |                 |                       |                       |
| Fieldwork                                       |                 |                       |                       |
| Course-specific Work Placement                  |                 |                       |                       |
| Out-of-class study time                         |                 |                       |                       |
| Quiz/Studio/Criticize                           |                 |                       |                       |
| Homework                                        |                 |                       |                       |
| Presentation / Seminar                          | 1               | 1                     | 12                    |
| Project                                         | 1               | 3                     | 12                    |
| Report                                          | 1               | 3                     | 12                    |
| Midterm Exam and Preparation for Midterm        |                 |                       |                       |
| Final Exam and Preparation for Final Exam       |                 |                       |                       |
| <b>Total Workload</b>                           |                 |                       |                       |
| <b>Total Workload / 25</b>                      |                 |                       |                       |
| <b>ECTS Credit</b>                              |                 |                       |                       |

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| Course Learning Outcomes |                                                            |
|--------------------------|------------------------------------------------------------|
| No                       | Outcome                                                    |
| L1                       | Acquisition of problem-solving and analysis skills         |
| L2                       | Acquisition of the ability to apply basic technical skills |
| L3                       | Programming ability acquisition                            |
| L4                       | Comprehend algorithm logic                                 |
| L5                       | Designing and writing the program that suits the needs     |

| Contribution of Course Learning Outcomes to Program Competencies/Outcomes                              |    |    |    |    |    |    |    |    |    |     |     |     |     |     |     |       |
|--------------------------------------------------------------------------------------------------------|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-------|
| <i>Contribution Level: 1: Very Slight, 2: Slight, 3: Moderate, 4: Significant, 5: Very Significant</i> |    |    |    |    |    |    |    |    |    |     |     |     |     |     |     |       |
|                                                                                                        | P1 | P2 | P3 | P4 | P5 | P6 | P7 | P8 | P9 | P10 | P11 | P12 | P13 | P14 | P15 | Total |
| L1                                                                                                     | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 4  | 4  | 4   | 5   |     |     |     |     |       |
| L2                                                                                                     | 4  | 5  | 4  | 5  | 4  | 5  | 5  | 5  | 4  | 5   | 5   |     |     |     |     |       |
| L3                                                                                                     | 5  | 5  | 5  | 5  | 4  | 5  | 4  | 5  | 5  | 4   | 5   |     |     |     |     |       |
| L4                                                                                                     | 4  | 4  | 4  | 4  | 4  | 4  | 4  | 4  | 4  | 4   | 5   |     |     |     |     |       |
| L5                                                                                                     | 5  | 5  | 5  | 4  | 5  | 4  | 5  | 5  | 4  | 5   | 5   |     |     |     |     |       |
| <b>Total</b>                                                                                           |    |    |    |    |    |    |    |    |    |     |     |     |     |     |     |       |