

*** Talented Program in Chemistry (Dated September 30th, 2015)**

Total credits of the curriculum: 170 credits

- General education knowledge: 33 credits

(Not including physical education, military defense education and soft skills)

- Basic courses: 2 credits

- Fundamental courses: 40 credits

+ *Required:* 31 credits

+ *Elective:* 9/13 credits

- Core courses: 46 credits

+ *Required:* 33 credits

+ *Elective:* 13/19 credits

- Advanced courses: 49 credits

+ *Required:* 21 credits

+ *Elective:* 18/88 credits

+ *Undergraduate thesis:* 10 credits

Available curriculum

| No. | Code | Subject | Credits | Credit hours | | | Prerequisite |
|--------------|---------|--|-----------|--------------|----------|------------|--------------|
| | | | | Lecture | Practice | Self-study | |
| I | | General education knowledge (Not including subjects 11-13) | 33 | | | | |
| 1 | PHI1004 | <i>Fundamental Principles of Marxism - Leninism 1</i> | 2 | 24 | 6 | | |
| 2 | PHI1005 | <i>Fundamental Principles of Marxism - Leninism 2</i> | 3 | 36 | 9 | | PHI1004 |
| 3 | POL1001 | <i>Ho Chi Minh Ideology</i> | 2 | 20 | 10 | | PHI1005 |
| 4 | HIS1002 | <i>The Revolutionary line of the Communist Party of Vietnam</i> | 3 | 42 | 3 | | POL1001 |
| 5 | INT1003 | <i>Introduction to Informatics 1</i> | 2 | 10 | 20 | | |
| 6 | INT1005 | <i>Introduction to Informatics 3</i> | 2 | 12 | 18 | | INT1003 |
| 7 | FLF2101 | <i>General English 1</i> | 4 | 16 | 40 | 4 | |
| 8 | FLF2102 | <i>General English 2</i> | 5 | 20 | 50 | 5 | FLF2101 |
| 9 | FLF2103 | <i>General English 3</i> | 5 | 20 | 50 | 5 | FLF2102 |
| 10 | FLF2104 | <i>General English 4</i> | 5 | 20 | 50 | 5 | FLF2103 |
| 11 | | <i>National Defence Education</i> | 8 | | | | |
| 12 | | <i>Physical Education</i> | 4 | | | | |
| 13 | | <i>Soft skills</i> | 3 | | | | |
| II | | Basic courses | 2 | | | | |
| 14 | PHI1051 | <i>Introduction to Logics</i> | 2 | 30 | | | |
| III | | Fundamental courses | 40 | | | | |
| III.1 | | Required | 31 | | | | |
| 15 | MAT1290 | <i>Linear Algebra</i> | 4 | 45 | 15 | | |
| 16 | MAT1291 | <i>Calculus 1</i> | 4 | 45 | 15 | | |
| 17 | MAT1292 | <i>Calculus 2</i> | 4 | 45 | 15 | | MAT1291 |
| 18 | MAT1101 | <i>Probability and Statistics</i> | 3 | 27 | 18 | | MAT1291 |
| 19 | PHY1159 | <i>General physics 1</i> | 3 | 42 | 3 | | MAT1291 |
| 20 | PHY1161 | <i>General physics 2</i> | 3 | 42 | 3 | | MAT1291 |
| 21 | PHY1104 | <i>General Physics Practice</i> | 2 | | 30 | | PHY1159 |

| No. | Code | Subject | Credits | Credit hours | | | Prerequisite |
|--------------|---------|--|--------------|--------------|----------|------------|--------------|
| | | | | Lecture | Practice | Self-study | |
| 22 | CHE1051 | <i>Accelerated chemistry 1</i> | 3 | 42 | | 3 | |
| 23 | CHE1052 | <i>Accelerated chemistry 2</i> | 3 | 42 | | 3 | |
| 24 | CHE1096 | <i>Accelerated chemistry Lab 2</i> | 2 | 5 | 25 | | CHE1052 |
| III.2 | | <i>Elective</i> | 9/13 | | | | |
| 25 | CHE1097 | <i>English for specific purposes- Math</i> | 2 | 25 | 5 | | FLF2101 |
| 26 | CHE1098 | <i>English for specific purposes- Phys</i> | 2 | 25 | 5 | | FLF2101 |
| 27 | CHE1099 | <i>English for specific purposes- Chem</i> | 2 | 25 | 5 | | FLF2101 |
| 28 | CHE1100 | <i>English for composition 1</i> | 2 | 30 | | | FLF2101 |
| 29 | CHE1101 | <i>English for composition 2</i> | 2 | 30 | | | FLF2101 |
| 30 | MAT1260 | <i>Differential equations</i> | 3 | 30 | 15 | | MAT1291 |
| IV | | Core courses | 46 | | | | |
| IV.1 | | <i>Required</i> | 33 | | | | |
| 31 | CHE2110 | <i>Fundamental Organic chemistry 1</i> | 4 | 55 | | 5 | CHE1052 |
| 32 | CHE1191 | <i>Organic chemistry Lab 1</i> | 2 | | 30 | | CHE1052 |
| 33 | CHE1077 | <i>Inorganic chemistry 1</i> | 3 | 40 | | 5 | CHE1052 |
| 34 | CHE1054 | <i>Inorganic chemistry Lab 1</i> | 2 | | 30 | | CHE1096 |
| 35 | CHE2114 | <i>Organic chemistry 2</i> | 3 | 42 | | 3 | CHE2110 |
| 36 | CHE2005 | <i>Organic chemistry Lab 2</i> | 2 | | 30 | | CHE1191 |
| 37 | CHE1082 | <i>Quantitative analysis</i> | 3 | 40 | | 5 | CHE1052 |
| 38 | CHE1058 | <i>Quantitative analysis lab</i> | 2 | | 30 | | CHE1082 |
| 39 | CHE1083 | <i>Physical chemistry 1</i> | 3 | 40 | | 5 | CHE1051 |
| 40 | CHE1085 | <i>Physical chemistry Lab 1</i> | 2 | | 30 | | CHE1052 |
| 41 | CHE1084 | <i>Physical chemistry 2</i> | 5 | 70 | | 5 | CHE1051 |
| 42 | CHE2008 | <i>Physical chemistry Lab 2</i> | 2 | | 30 | | CHE1085 |
| IV.2 | | <i>Elective</i> | 13/19 | | | | |
| 43 | CHE2132 | <i>Instrumental characterization</i> | 3 | 45 | | | CHE1082 |
| 44 | CHE2133 | <i>Instrumental characterization Lab</i> | 2 | 5 | 25 | | CHE1082 |
| 45 | CHE1091 | <i>Principles of chemical</i> | 3 | 40 | | 5 | CHE1052 |

| No. | Code | Subject | Credits | Credit hours | | | Prerequisite |
|------------|---------|---|--------------|--------------|----------|------------|--------------|
| | | | | Lecture | Practice | Self-study | |
| | | <i>engineering</i> | | | | | |
| 46 | CHE1062 | <i>Chemical engineering Lab</i> | 2 | | 30 | | CHE1091 |
| 47 | CHE2138 | <i>Biochemistry and phys bases of life</i> | 3 | 45 | | | |
| 48 | CHE2137 | <i>Introduction to material chemistry</i> | 3 | 45 | | | CHE1077 |
| 49 | CHE3231 | <i>Quantum mechanics and spectroscopy</i> | 3 | 40 | | 5 | CHE1083 |
| V | | Advanced courses | 49 | | | | |
| V.1 | | Required | 21 | | | | |
| 50 | CHE2128 | <i>Advanced inorganic chemistry</i> | 3 | 45 | | | CHE1077 |
| 51 | CHE2131 | <i>Advanced organic chemistry</i> | 3 | 45 | | | CHE2114 |
| 52 | CHE2129 | <i>Advanced analytical chemistry</i> | 3 | 45 | | | CHE1082 |
| 53 | CHE2130 | <i>Chemical kinetics and catalysis</i> | 3 | 45 | | | CHE1084 |
| 54 | CHE3101 | <i>Research project</i> | 3 | | 40 | 5 | CHE1096 |
| 55 | CHE3102 | <i>Research project</i> | 3 | | 40 | 5 | CHE3101 |
| 56 | CHE3103 | <i>Research project 3</i> | 3 | | 40 | 5 | CHE3102 |
| V.2 | | Elective | 18/88 | | | | |
| 57 | CHE2010 | <i>Industrial Practice</i> | 2 | | 30 | | |
| 58 | CHE1092 | <i>Molecular symmetry and group theory</i> | 3 | 45 | | | |
| 59 | CHE1079 | <i>Environmental chemistry</i> | 3 | 45 | | | CHE1082 |
| 60 | CHE2147 | <i>Green chemistry</i> | 3 | 45 | | | CHE1082 |
| 61 | CHE2146 | <i>Chemical reaction engineering</i> | 3 | 45 | | | CHE1091 |
| 62 | CHE3045 | <i>Petrochemistry</i> | 3 | 42 | | 3 | |
| 63 | CHE2151 | <i>Polymer science and applied engineering</i> | 3 | 45 | | | CHE2137 |
| 64 | CHE3211 | <i>Physical inorganic chemistry</i> | 3 | 40 | | 5 | CHE1077 |
| 65 | CHE3215 | <i>Topics in inorganic chemistry</i> | 3 | 40 | | 5 | CHE1077 |
| 66 | CHE3212 | <i>Physical characterization for Material chemistry</i> | 3 | 40 | | 5 | CHE1077 |
| 67 | CHE3213 | <i>Bioinorganic chemistry</i> | 3 | 40 | | 5 | CHE1077 |

| No. | Code | Subject | Credits | Credit hours | | | Prerequisite |
|------------|---------|---|------------|--------------|----------|------------|--------------|
| | | | | Lecture | Practice | Self-study | |
| 68 | CHE3192 | <i>Applied inorganic chemistry</i> | 3 | 40 | | 5 | CHE1077 |
| 69 | CHE3205 | <i>Physical organic chemistry</i> | 3 | 40 | | 5 | CHE2110 |
| 70 | CHE3247 | <i>Organic catalyst</i> | 3 | 40 | | 5 | CHE2110 |
| 71 | CHE3142 | <i>Chemistry of natural Compound</i> | 3 | 40 | | 5 | CHE2110 |
| 72 | CHE3220 | <i>Topics in organic chemistry</i> | 3 | 40 | | 5 | CHE2110 |
| 73 | CHE3219 | <i>Characterization methods for organic chemistry</i> | 3 | 40 | | 5 | CHE2110 |
| 74 | CHE3187 | <i>Fundamental of modern organic chemistry</i> | 3 | 40 | | 5 | CHE2114 |
| 75 | CHE3218 | Advanced organic synthesis | 3 | 40 | | 5 | CHE2110 |
| 76 | CHE3248 | <i>Sample preparation techniques in Analysis</i> | 3 | 40 | | 5 | CHE1082 |
| 77 | CHE3139 | <i>Spectrophotometric Analysis</i> | 3 | 40 | | 5 | CHE1082 |
| 78 | CHE3249 | <i>Electrochemical analysis</i> | 3 | 40 | | 5 | CHE1082 |
| 79 | CHE3250 | <i>Separation and Chromatographic Analysis</i> | 3 | 40 | | 5 | CHE1082 |
| 80 | CHE3014 | <i>Chemometrics in analytical chemistry</i> | 2 | 28 | | 2 | CHE1082 |
| 81 | CHE3234 | <i>Topics in physical chemistry</i> | 3 | 40 | | 5 | CHE1084 |
| 82 | CHE3230 | <i>Statical thermodynamic</i> | 3 | 40 | | 5 | CHE1084 |
| 83 | CHE3144 | <i>Catalytic theories and applications</i> | 3 | 40 | | 5 | CHE1083 |
| 84 | CHE2241 | <i>Surface and colloid chemistry</i> | 3 | 45 | | | CHE1084 |
| 85 | CHE2140 | <i>Computational Chemistry and Biology</i> | 3 | 45 | | | INT1003 |
| 86 | CHE2102 | <i>Polymer chemistry</i> | 3 | 40 | | 5 | CHE2110 |
| V.3 | | <i>Undergraduate thesis</i> | 10 | | | | |
| 87 | CHE4054 | <i>Undergraduate thesis</i> | 10 | | | | |
| | | Total | 170 | | | | |