

Piano Technician II

PEIMS Code: N1170198

Abbreviation: PINTECH2

Grade Level(s): 10-11

Award of Credit: 1.0

State Approved Innovative Course

- Districts must have local board approval to implement innovative courses.
- In accordance with Texas Administrative Code (TAC) §74.27, school districts must provide instruction in all essential knowledge and skills identified in this innovative course.
- Innovative courses may only satisfy elective credit toward graduation requirements.
- Please refer to [TAC §74.13](#) for guidance on endorsements.

Course Description:

The Piano Technician II course builds upon the foundations from Piano Technician I. Students will improve their skills in piano tuning and technical skills with an emphasis on tuning theory and practice, tuning hammer technique, pitch references/devices, interval tuning, string replacement, piano moving, and basic business management skills. The Piano Technician II course will advance students' knowledge, skills, and technologies required for future employment in the music industry as a piano tuner or piano technician. Students will develop ear training skills and the physical dexterity to manipulate tuning tools in order to tune all intervals. Students will learn tuning procedures, string repairs/replacement, piano moving, action repair, financial literacy, professional conduct, and OSHA safety protocols.

Upon successful completion of the set of Piano Technician courses, the skills taught will allow students to begin advanced study at trade or postsecondary schools, as well as begin working at institutions and piano dealers as a fully competent piano technician.

Essential Knowledge and Skills:

- (a) General Requirements: This course is recommended for students in Grades 10-12. Required prerequisite completion of Piano Technician I. Students shall be awarded one credit for successful completion of this course.
- (b) Introduction.
 - (1) Fine Arts instruction provides content aligned with challenging academic standards and relevant technical knowledge and skills for students to further their education and succeed in the current piano tuning/technician profession.
 - (2) The Piano Technician II course builds upon the foundations from Piano Technician I. Students will improve their skills in piano tuning and technical skills with an emphasis on tuning theory and practice, tuning hammer technique, pitch references/devices, interval

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tuning, string replacement, piano moving, and basic business management skills. The Piano Technician II course will advance students' knowledge, skills, and technologies required for future employment in the music industry as a piano tuner or piano technician. Students will develop ear training skills and the physical dexterity to manipulate tuning tools in order to tune all intervals. Students will learn tuning procedures, string repairs/replacement, piano moving, action repair, financial literacy, professional conduct, and OSHA safety protocols.

- (3) Students are encouraged to participate in extended learning experiences such as shop projects, private lessons in piano tuning, and group lessons in related topics.
- (c) Knowledge and Skills.
 - (1) The student demonstrates professionalism as a representative of a company or organization. The student is expected to:
 - (A) provide examples of the vision statements and list the benefits of having a vision statement;
 - (B) analyze examples of company policies;
 - (C) discuss the importance of goals of a company or organization;
 - (D) explain why it is necessary to protect company property;
 - (E) research best practices to protect sensitive information about a company and its clients;
 - (F) explain the importance of following company policies and guidelines; and
 - (G) use the appropriate forms and documents provided by the company or organization, such as invoices, work logs, price lists, inventories, and expense reports.
 - (2) The student explains the parts of the piano and their importance to piano tuning theory. The student is expected to:
 - (A) describe the functions of the various parts of the piano, including essential components of the piano action, keyboard, pedal mechanisms, soundboard bridge, pinblock, strings, string bearing components, and cabinetry;
 - (B) use proper nomenclature when describing the parts of the piano, including essential components of the piano action, keyboard, pedal mechanisms, soundboard bridge, pinblock, strings, string bearing components and cabinetry in the classroom;
 - (C) explain the relationship of the natural overtone series in music to the overall tone of the instrument;
 - (D) describe the application of equal temperament tuning;
 - (E) demonstrate the differences in cents for pitches tuned in both just temperament and equal temperament; and
 - (F) demonstrate narrow and wide intervals necessary for proper tuning.
 - (3) The student demonstrates the proper function and application of the tools, equipment, technologies, and materials used in piano tuning and repair. The student is expected to:

- (A) apply industry standard safety protocols in shop workspaces and while using piano technician tools and equipment;
 - (B) use appropriate personal protective equipment while tuning, repairing, and moving pianos;
 - (C) demonstrate referencing pitches with a tuning fork and with an electronic tuning device;
 - (D) apply proper grip of the tuning hammer, allowing for the correct setting of the tuning pin;
 - (E) demonstrate correct placement the tuning hammer between twelve and two o'clock to provide appropriate leverage on the tuning pin;
 - (F) ensure no-cent variation when struck at the fortississimo dynamic level by setting the tuning pin securely;
 - (G) explain how the imperfect rigidity of the tuning pin and the unequal distribution of tension along the entire length of a piano string necessitate proper tuning hammer technique for tuning stability;
 - (H) explain the theory of near coincident partials and the resultant audible beats which make aural tuning possible through the evaluation of beat rates;
 - (I) explain how the differences in string dimensions across the range of the piano contributes to deviations in the harmonic series from one string to the next string;
 - (J) determine the need for the procedure known as the pitch raise by analyzing how changes in string tension affect neighboring strings through the down bearing on the bridge/soundboard;
 - (K) explain how the components of the internal mechanism known as the action interact with each other to capture the artistic expressiveness of the pianist; and
 - (L) evaluate the functioning of action components.
- (4) The student learns and practices the basic procedure of setting an equal temperament and practices tuning octaves and unisons throughout the full range of the piano. The student is expected to:
- (A) experiment with the Pythagorean tuning, noting the presence of the Pythagorean comma as a rapid audible beat between the first and last pitches of the tuning sequence;
 - (B) tune and compare a pure major third with the major third of the Pythagorean tuning (Pythagorean third), noting this discrepancy as the syntonic comma;
 - (C) experiment with Just Intonation, meantone temperament and well temperaments, noting pros and cons of the differing ways that each redistributes the Pythagorean and syntonic commas;
 - (D) aurally tune the reference pitch to a tuning fork or electronic tuning device, practicing for increased accuracy and stability;
 - (E) aurally tune the pitch, an octave below the reference pitch, such that it is beatless and passes the 4:2 octave test;

- (F) practice a basic equal temperament tuning sequence to tune every pitch within the temperament octave (usually A3 to A4 but can be elsewhere in the 3rd and 4th registers) utilizing tempered fourths and fifths or a combination of fourths, fifths, major thirds, and major sixths;
 - (G) tune an equal temperament such that all fourths are wide (i.e. more expansive than a pure fourth) with an audible beat of approximately 1 beat per sec (1Hz), all fifths are narrow with an audible beat of approximately 0.5 Hz, and the beat rates of the thirds and sixths gradually get faster as they are played ascending the chromatic scale (and get slower as they descend the chromatic scale);
 - (H) practice identifying the approximate beat rates of various intervals within the temperament octave;
 - (I) practice various aural tests which use relationships of beat rates between intervals sharing common coincident partials;
 - (J) tune the various octave types, including the, 6:3 octave, 4:2 octave, 2:1 octave, and 4:1 double octave, in the appropriate registers;
 - (K) practice tuning by octaves from the temperament up to C8 and down to A0; and
 - (L) practice the procedure known as a pitch raise.
- (5) The student learns the procedure to replace a piano string correctly and safely according to industry standards through practicing the relevant skills. The student is expected to:
- (A) demonstrate correct formation of the coil and beckett;
 - (B) demonstrate making the coil with 3-4 clockwise turns;
 - (C) describe the correct string path through the hitch pins, bridge pins, and agraffes;
 - (D) practice the procedure to splice strings following appropriate safety measures;
 - (E) practice the procedure to create a hitch pin loop;
 - (F) demonstrate correct formation of hitch pin loops;
 - (G) explain the importance of applying the string in such a way that it is properly leveled; and
 - (H) install single strings in such a way that it has a tight loop.
- (6) The student analyzes marketing and advertising strategies. The student is expected to:
- (A) define marketing and advertising;
 - (B) describe marketing information and how it influences marketing decisions;
 - (C) investigate how businesses make pricing decisions, including factors such as supply and demand, perceived value, and competition;
 - (D) analyze existing websites for effectiveness;
 - (E) research the advantages and disadvantages of the types of advertising, including print and digital modes; and
 - (F) use appropriate technology to create promotional materials such as print ads or a website.

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- (7) The student knows the nature and scope of social media marketing. The student is expected to:
- (A) define social media marketing;
 - (B) identify the various social media platforms and purposes;
 - (C) identify and describe significant trends in the development of social media;
 - (D) describe the social media marketing ecosystem and its impact on traditional marketing strategy;
 - (E) analyze ethical guidelines and codes of ethics to explain how or why they are important to social media organizations; and
 - (F) identify advantages and disadvantages associated with social media marketing.

Recommended Resources and Materials:

Resources

- Collection of good and poor condition pianos
- Collection of piano tuning levers and piano tuning mute strips and felts
- Piano action regulating tool sets
- Piano stringing tool sets
- Various screwdrivers
- Socket set
- Drill index
- Various piano bushing cauls and felts
- Mobile worktables and tool carts
- Various industry related jigs
- Stock parts
- Action models by various manufacturers
- Various woodworking tools-- bandsaw, standing belt sander, standing drill press, planer (hand and machine), routers, hand drills
- Dust collection systems

Technology

iPad with tuning apps: Cybertuner™, Verituner™, TuneLab™ and PiaTune™

- Reyburn Piano Services, Inc. (2019) Cybertuner™ (version 7.9.2) [Mobile application software]
- Veritune, Inc. (2018) Verituner™ (version 4.7.7) [Mobile application software]
- Real-Time Specialties (2017) TuneLab Piano Tuner™ (version 4.3.1) [Mobile application software]
- HAKKI BAYKA (2018) PiaTune™ (version 2.1) [Mobile application software]

Instructional Materials

Grec, M. *Pianos Inside Out: A Comprehensive Guide to Piano Tuning, Repairing and Rebuilding*. Mandeville, LA: In Tune Press, 2013.

Potter, R. *The Piano Action Handbook*. Kansas City, MO: Piano Technicians Guild Foundation Press, 1991.

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Reblitz, A. A. *Piano Servicing, Tuning and Rebuilding: A Guide for the Professional, Student, and Hobbyist*. Lanham: Rowman & Littlefield, 2019.

Travis, J. W. *A Guide to Restrunging*. Takoma Park, MD: J.W. Travis, 1982.

Kottick, E. L. *The Harpsichord Owners Guide: A Manual for Buyers and Owners*. United States: The University of North Carolina Press, 2013.

The Piano Technicians Guild Foundation Press. (2019) *The Piano Technicians Journal*.

Recommended Course Activities:

- Piano tuning practice
- Daily lectures in tuning theory
- Tuning and repair one-on-one lessons
- Tuning and repair group lessons
- Masterclasses from visiting technicians
- Attend existing workshops
- Practicum tuning and repairing pianos within the campus or district
- Internship at university piano technician programs and/or local area piano retailers

Suggested methods for evaluating student outcomes:

Students will be evaluated based upon results obtained from measurements made from exacting industry standard jigs, guides, and listening devices, with their grades calculated and recorded based upon syllabus standards.

- Tuning Hammer Technique—Demonstrates proper holding of the tuning hammer that allows for correct setting of the pin.
- Tuning Stability—Demonstrates setting the pin in such a way that allows for no cent variation when hit at a FFF Blow.
- Active Work Record—Maintains an active record of work on paper and online using digital record keeping systems.
- Shop Safety—Follows assigned safety protocols in shop workspaces.
- Parts and Design—Properly identifies various parts of the piano and can use proper nomenclature.
- Unison Tuning—Demonstrates accurate tuning with no variance or less than 1 cent variance.
- Octave Tuning—Demonstrates accurate tuning with less than 1 cent variance WIDE or demonstration of perfect 12th.
- 4th Tuning—Demonstrates accurate tuning with 1 beat per second WIDE.
- 5th Tuning—Demonstrates accurate tuning with less than 1 cent NARROW.
- 3rd Tuning—Demonstrates accurate tuning by continually building in speed during chromatic 3rd scales, evenly and slowly.

Teacher qualifications:

An assignment for Piano Technician I-IV is allowed with one of the following certificates.

- All-Level Music.
- Grades 6-12 or Grades 9-12--Music.

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- Junior High School (Grades 9-10 only) or High School--Music.
- Music: Early Childhood-Grade 12.
- Secondary Music (Grades 6-12).
- Trade and Industrial Education: Grade 6-12.
- Trade and Industrial Education: Grade 8-12.

Experience as a Master Piano Technician as determined by recognized manufacturer's standards is required as is certification in Piano Technology from a recognized school or an apprenticeship program through a recognized piano manufacturer (Steinway, Kawai, Boesendorfer and Yamaha).

Additional information:

- Additional training through collaboration with the University of Houston Moores School of Music Master Piano Technician program. Due to the collaborative nature of our relationship with the Moores School of Music, some training will be included at no additional cost.
- Additional training through collaboration with Steinway Piano Gallery, piano retailers, as well as Steinway & Sons, piano manufacturers. Due to the collaborative nature of our relationship with Steinway Piano Gallery and Steinway & Sons, some training will be included at no additional cost. There will be piano technician trainings at the Steinway & Sons factory. Anticipated additional training costs \$6,000 to cover travel and expenses at the Steinway factory in Queens, New York.