Texas Education Agency

Piano Technician III

PEIMS Code: N1170199
Abbreviation: PINTECH3
Grade Level(s): 11-12
Award of Credit: 1.0

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 III course advances the skills and knowledge learned in the Piano Technician I and II courses. Emphasis will be placed on refining piano tuning skills and action repair as well as action regulation. The Piano Technician III course will continue to refine and perfect the necessary knowledge, skills, and technologies required for future employment in the music industry as a piano tuner or piano technician. Students will refine tuning skills and acquire the necessary skills and knowledge to regulate the piano. Students will learn cabinetry repair, regulation, 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 11-12. Required prerequisite completion of Piano Technician II. 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 III course advances the skills and knowledge learned in the Piano Technician I and II courses. Emphasis will be placed on refining piano tuning skills and action repair as well as action regulation. The Piano Technician III course will continue to refine and perfect the necessary knowledge, skills, and technologies required for future

employment in the music industry as a piano tuner or piano technician. Students will refine tuning skills and acquire the necessary skills and knowledge to regulate the piano. Students will learn cabinetry repair, regulation, 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, group lessons in related topics, and tuning district-owned equipment with supervision.

(c) Knowledge and Skills.

(1) The student demonstrates professionalism in customer relations. The student is expected to:

(A) exhibit professionalism in manners, dress, and demeanor;

(B) demonstrate the ability to inform the customer of what realistic outcomes can be expected from the work to be performed;

(C) demonstrate the ability to educate the customer about the proper care and maintenance of a piano, including: the ideal ambient temperature and relative humidity, the recommended tuning and maintenance schedule, and proper cleaning practices;

(D) demonstrate the ability to explain to the customer the purpose of the work to be performed;

(E) demonstrate the ability to make appropriate recommendations for proposed work based on the evaluation of a given piano;

(F) explain the importance of considering the customer's needs and expectations as well as the goals of the company or organization; and

(G) explain why it is important to provide true and accurate quotes, estimates, and expected outcomes for a proposed job prior to beginning work.

(2) The student describes the parts of the piano and their function and explains piano tuning theory. The student is expected to:

(A) explain the relationship of the natural overtone series to equal temperament tuning;

(B) explain the purpose of equal temperament in historical context;

(C) compare and contrast differences in cents for pitches tuned in both just temperament and equal temperament; and

(D) explain the relevance of narrow and wide intervals in piano tuning.

(3) The students independently applies the tools, equipment, technologies, and materials used in piano tuning and repair. The student is expected to:

(A) follow industry-standard safety protocols in shop workspaces and while using piano technician tools and equipment in a simulated or real-world setting;

(B) determine personal protective equipment needed while tuning, repairing, or moving pianos;

(C) hold the tuning hammer properly, which allows for the correct setting of the tuning pin;

(D) position the tuning hammer between twelve and two o'clock to provide appropriate leverage on the tuning pin;

(E) set the tuning pin securely to ensure no cent variation when struck at the fortississimo dynamic level;

(F) 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;

(G) calculate the beat rate of various tempered intervals and derive aural test of intervals using the theory of near coincident partials;

(H) analyze 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 using the theory of inharmonicity;

(I) 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;

(J) demonstrate how the components of the internal mechanism known as the action interact with each other as a complex mechanism designed to capture the artistic expressiveness of the pianist by comparing and contrasting properly and improperly regulated pianos; and

(K) evaluate the functioning of action components and make necessary adjustments and repairs.

(4) The student refines temperament-setting skills and extends the intervallic relationships of the temperament throughout the full range of the piano. The student is expected to:

(A) refine the temperament after its initial tuning;

(B) evaluate the temperament for intervals with beat rates that are inconsistent with the temperament;

(C) test strategically inconsistent intervals to determine the appropriate adjustment as well as which pitch in the interval is in need of adjustment;

(D) tune unisons within the temperament repeating evaluation and refinement of the temperament with the unisons tuned and unmuted;

(E) practice identifying beat rates and the progression of beat rates through the use of a metronome;

(F) to refine the tuning of the 1st, 2nd, 5th, and 6th registers using the progression of beat rates of major 10ths and major 17ths; and

(G) refine the tuning of the treble section up to C8 as well as using double octaves to refine the bass section down to A0 using double octaves, triple octaves, and quadruple octaves.

(5) The student replaces a piano string correctly and safely according to industry standards. The student is expected to:

(A) install the string so the beckett/tang holds;

(B) attach the strings with 3-4 clockwise coils around the tuning pins consistently across the piano;

(C) ensure the string along the correct path through the hitch pins, bridge pins, and agraffes;

(D) apply the string in such a way that it is properly leveled; and

(E) apply single strings in such a way that it has a tight loop.

(6) The student explains the correct procedures for moving a piano. The student is expected to:

(A) explain that moving a piano safely and appropriately will ensure the integrity and longevity of the instrument;

(B) place a piano on the skid without the lid lip on the skid;

(C) center a piano on the dolly properly and stably;

(D) wrap a piano to protect the case from straps;

(E) pull straps taut to hold a piano to the dolly;

(F) describe how to seal a lid closed;

(G) describe how to label and wrap piano parts properly;

(H) describe the proper methods for lifting an upright piano; and

(I) describe the proper techniques for tipping a grand piano both with and without a lyre; and

(J) communicate effectively and clearly with piano owner and assistant throughout the process of moving the piano.

(7) The student performs various routine repairs that are frequently encountered in the field. The student is expected to:

(A) demonstrate basic key repairs including replacing the keytops, re-bushing the keys, easing the keys, lubricating the front rail pins and the balance rail pins, squaring the keys, spacing the keys, and shimming the key slip;

(B) demonstrate basic hammer repairs including

(i) removing the hammer from the shank;

(ii) gluing the hammer to the shank;

(iii) repairing broken hammer shanks;

(iv) lubricating the hammer shank flange center pin;

(v) re-pinning and re-brushing the hammer shank flange;

(vi) replacing the bridle strap, hammer butt spring, hammer butt spring cord, and hammer knuckle;

(vii) squaring, shaping, and spacing the hammers; and

(viii) aligning and mating the hammers to strings;

(C) demonstrate basic wippen repairs including

(i) repairing a broken jack;

(ii) squaring a jack;

(iii) lubricating the wippen flange center pin;

(iv) re-pinning and re-brushing the wippen flange center pin; and

(v) replacing the jack spring; and

(D) demonstrate basic damper repairs including

(i) connecting the pedal linkages;

(ii) gluing the damper felt to the damper block;

(iii) adjusting or replacing the damper;

(iv) adjusting the timing of the damper;

(v) tightening loose leads in underlevers;

(vi) lubricating sluggish underlever flange center pin; and

(vii) replacing the damper lever.

(8) The student performs regulating of the piano. The student is expected to:

(A) explain the sequence of steps for regulating an upright piano and a grand piano, including adjustments to various components of the piano action as well as performing these adjustments in the correct sequence to affect the overall functioning of the piano action;

(B) regulate the various adjustable components of an upright piano action including

(i) adjusting “key dip” (depth of key descent) and key height;

(ii) aligning hammers to strings and jacks to hammer butts; and

(iii) adjusting “lost motion” (space between jack and hammer butt at rest), “let off” (moment at which the jack disengages from the hammer butt), and “checking” (distance at which the returning hammer is caught by the backcheck);

(C) regulate the various adjustable components of a grand piano action including

(i) “bedding” the key frame;

(ii) leveling the keys;

(iii) evaluating touch weight, repetition spring tension, balancier height, “after touch” (amount of additional movement of key after let off and drop occur), speed of repetition, and evenness of touch from one key to the next;

(iv) aligning the hammers to string unisons, repetition levers to the hammer knuckles, jacks to the knuckle cores, and backchecks to the hammer tails; and

(v) adjusting the let off, white key dip, black key dip by matching “after touch” of the white keys, drop (distance hammer falls before the drop-

screw encounters the balancier), checking, repetition spring tension, and balancier height.

(9) The student identifies factors that affect credit worthiness. The student is expected to:

(A) discuss how character, capacity, and collateral can adversely or positively impact an individual's credit rating and the ability to obtain credit;

(B) describe how to access and interpret a sample credit report and score;

(C) describe the importance of monitoring credit reports regularly and addressing mistakes;

(D) identify factors that could lead to bankruptcy such as medical expenses, job loss, divorce, or a failed business; and

(E) appraise the impact of borrowing decisions on credit score, including consequences of poor credit management and bankruptcy.

(10) The student evaluates a decision to use credit. The student is expected to:

(A) examine the components of the cost of borrowing, including annual percentage rate (APR), fixed versus variable interest, length of term, grace period, and additional fees such as late payment, cash advance, and prepayment penalties;

(B) explain strategies to reduce total cost of borrowing such as making a higher down payment and additional principal payments;

(C) differentiate between the use and cost of debit and credit cards.

(D) identify risk as potential loss of assets or earning potential; and

(E) apply risk management strategies, including avoiding, reducing, retaining, and transferring risk.

(11) The student explains the advantages and disadvantages of using of credit to make purchases. The student is expected to:

(A) evaluate the impact of credit decisions on monthly budget, income statement, and net worth statement; and

(B) discuss how personal character, capacity, and collateral can adversely or positively impact an individual's credit rating and the ability to obtain credit.

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™, Veritуner™, TuneLab™ and PiaTune™

- Reyburn Piano Services, Inc. (2019) Cybertuner™ (version 7.9.2) [Mobile application software]
- Veritune, Inc. (2018) Veritуner™ (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.

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 Restringing*. 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.
- 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.