

# Qt Tutorials Course Outline

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### Qt Core

- **Beginner**
  - Qt and Qt Creator
    - Overview
    - Licensing
    - Downloading
    - Installing
    - Configuration
    - Kits
    - Project files
    - Help
  - Project Types
    - Console
    - Widget
    - QML
    - Library
  - Overview of C++
    - History
    - Legacy C++
    - Modern C++
    - Qt and C++
    - Main function
    - Standard library
    - Example: Hello World with qDebug
  - Variables
    - Comments
    - Booleans
    - Numbers
    - Enums
    - Structs
  - Input and output
    - STDIN
    - STDOUT
    - STDERR
    - QDebug
  - Pointers
    - Creating
    - Deleting
    - Stack vs Heap
    - Memory management
  - Flow Control

- IF ELSE
- Ternary
- Switch
- Do While
- For and For Each
- Functions
  - Creating
  - Returning values
  - Overloading
  - By ref
  - By value
- Classes
  - Creating
  - Importing
  - Constructors
  - Deconstructors
  - Inheriting
  - Overriding
  - Abstract
- Scope
  - Functions
  - Classes
  - Global
- Casting
  - Normal
  - Static cast
  - Dynamic cast
  - QObject Cast
- Signals and Slots
  - Creating
  - Connecting
  - Disconnecting
  - Example: Working with properties
- Error handling
  - Errors vs exceptions
  - Throwing
  - Try catch
  - Finally
  - Catch All
- Generics
  - Generics
  - Generic Functions
  - Generic Classes
  - Templates
- Libraries

- Creating
  - Importing
  - Using
- Common Classes
  - QObject
  - qint
  - QString
  - QDate
  - QTime
  - QDateTime
  - QVariant
  - Example: using a QVariant to store unknown data types
- **Intermediate**
  - Pointers
    - Parent and Child
    - QWeakPointer
    - QScopedPointer
    - QSharedPointer
    - Example: Using QScopedPointer
  - Collections
    - QList
    - QSet
    - QHash
    - QMap
    - QLinkedList
    - Example: Lists of objects
  - File System
    - QDir
    - QFile
    - QFileInfo
    - Reading Files
    - Writing files
    - Appending files
    - Write modes
    - QFileSystemWatcher
    - QLockfile
    - Example: Reading files
  - Logging
    - debug
    - critical
    - info
    - warning
    - QMessageLogger
  - Encoding data
    - ASCII

- UTF-8
  - XML
  - JSON
  - Base64
  - Serializing objects
  - Example: Serialize object and load it from disk
- Macros
  - QObject Macro
  - qDeleteAll
  - qFill
  - qSort
  - qCopy
  - qFind
  - qSort
- System
  - QSysInfo
  - QSettings
  - QProcess
  - Determine OS at run time
  - Example: Run code depending on the OS
- Timer
  - QTimer
  - SingleShot
  - Repeating
  - Example: File watcher
- Meta Object System
  - QMetaObject
  - Q\_ClassInfo
  - Invoke Method
  - Return Type
- Design Patterns
  - Singleton patterns
  - Factories
  - Prototypes
- **Advanced**
  - Sockets
    - Networking fundamentals
    - TCP vs UDP
    - TCP Socket
    - TCP Server Socket
    - QNetworkAccessManager
    - UDP
    - Example: TCP – serialize object and send it to client
  - Threads
    - MoveToThread

- Qthread
- QFuture
- QThreadPool & QRunnable
- QConcurrence
- Example: TCP Server
- Models
  - Model view programming
  - QStringList
  - QStandardItem
  - QfileSystemModel
  - QAbstractItemModel
  - QAbstractList
  - QAbstractTableModel
- Database
  - Databases
  - Setup MySQL
  - Connection
  - Add Items
  - Update Items
  - Delete Items
  - Search items
  - QSqlQueryModel
  - QSqlTableModel
  - QSqlRelationalTableModel
- Charts and Plotting
  - Line and spline charts
  - Area and scatter charts
  - Bar charts
  - Pie charts
  - Box-and-whiskers charts
  - Candlestick charts
  - Polar charts
- Plugins
  - Creating
  - Loading
  - Using
  - Example: TCP Server with Plugins

## Qt Widgets

- Beginner
  - Dialogs
  - Buttons
  - Input

- Layouts
- Containers
- Intermediate
  - QMainWindow
  - ListViewWidget
  - Listview and Model
  - TreeviewWidget
  - Treeview and Model
- Advanced

## **QML**

- Beginner
- Intermediate
- Advanced

## **Qt Embedded**

- Beginner
- Intermediate
- Advanced

## **Qt Masters – each one is a separate class**

- 3D – Use Qt 3d Studio and Blender
- Firebase
- Boost.io
- OpenCV
- Encryption – OpenSSL or Botan
- High performance TCP Server
- Database